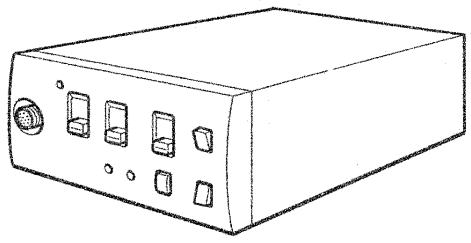
TOSHIBA

FILE NO. 210-9713

SERVICE MANUAL

CCD COLOR CAMERA

IK-CU50



IK-CU50

PRINTED IN JAPAN, Apr., 1998 Ⓢ

SAFETY NOTICE

SAFETY PRECAUTIONS

LEAKAGE CURRENT CHECK

The AC line cord of power supply connect to terminal. And plug the AC line cord of power supply into a 230V AC outlet. Use an AC voltmeter, having 5000Ω per volt or more sensitivity.

Connect a 1500Ω 10W resistor, paralleled by a 0.15 μF 150V AC capacitor between a known good earth ground (water pipe, conduit, etc.) and all exposed metal parts of cabinet (screw heads etc.).

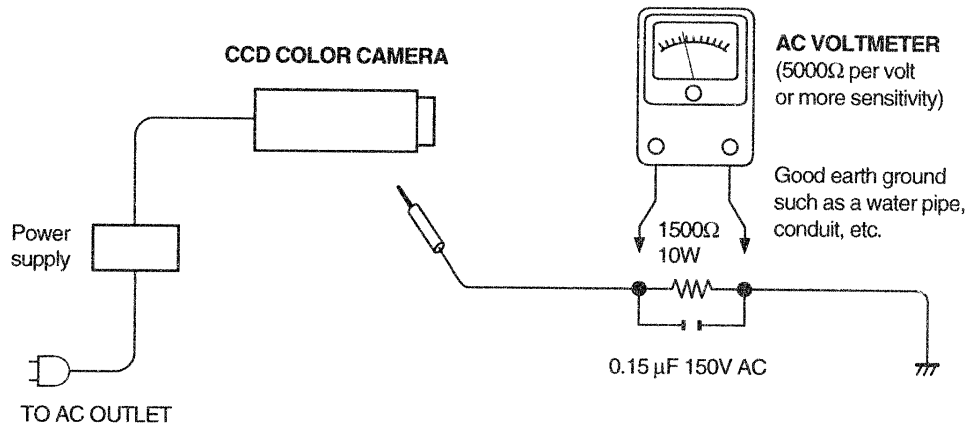
Measure the AC voltage across the 1500Ω resistor.

The test must be conducted with the AC switch on and then repeated with the AC switch off. The AC voltage indicated by the meter may not exceed 0.3V. A reading exceeding 0.3V indicates that a dangerous potential exists, the fault must be located and corrected.

Repeat the above test with AC line reversed.

NEVER RETURN A CAMERA TO THE CUSTOMER WITHOUT TAKING NECESSARY CORRECTIVE ACTION.

READING SHOULD NOT EXCEED 0.3V



Test all exposed metal.

Voltmeter Hook-up for Leakage Current Check

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

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SECTION 1
GENERAL DESCRIPTION

1. INFORMATION

CAUTION
This product is class A of EN55022. In residential area, it may cause radio interference. In this case, user takes measures to meet the situation.

INFORMATION
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

USER-INSTALLER CAUTION: Your authority to operate this FCC verified equipment could be voided if you make changes or modifications not expressly approved by the party responsible for compliance to Part 15 of the FCC rules.

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations.

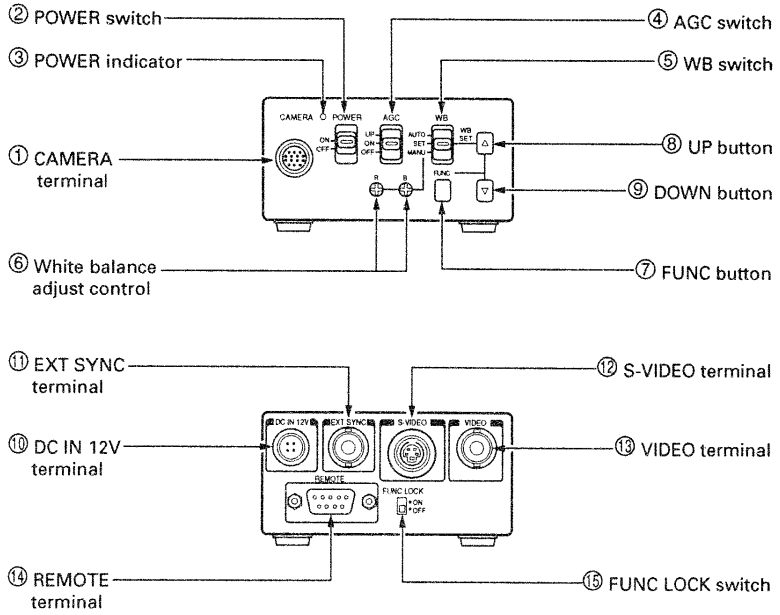
Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

2. COMPONENTS

(1) Camera control unit 1
(2) Accessories
  (a) Instruction manual 1
  (b) Ferrite core (for REMOTE terminal cable) 1
  (Refer to item 4.4)

3. NAMES AND FUNCTIONS

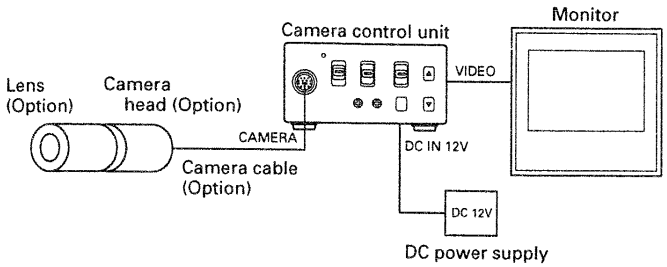
Camera Control Unit



① CAMERA terminal	Connects to the camera head.
② POWER switch	Turns on and off the camera control unit.
③ POWER indicator	Lights up when the power is turned on.
④ AGC switch	Selects the gain mode. (AGC OFF/AGC ON/SENS UP)
⑤ WB switch	Selects the white balance mode. (MANU/SET/AUTO)
⑥ White balance adjust control	Adjusts the R gain and B gain with the white balance mode set to MANU by the WB switch ⑤.
⑦ FUNC button	Determines the setting indication contents when the setting menu is displayed on the screen.
⑧ UP button	Selects the setting item when the setting menu is displayed on the screen. (When the WB switch ⑤ is set to SET, pressing the UP button for more than 2 sec. activates the white balance SET operation.)
⑨ DOWN button	Selects the setting item when the setting menu is displayed on the screen.
⑩ DC IN 12V terminal	Accepts a DC power supply (12V).
⑪ EXT SYNC terminal	Accepts an external sync signal to synchronize the camera output signal with external signal.
⑫ S-VIDEO terminal	Connects terminal to S input terminal of a monitor or a VCR, etc. Can be used at the same time as video terminal.
⑬ VIDEO terminal	Connects terminal to video input terminal of a monitor or a VCR, etc. Can be used at the same time with the S-VIDEO terminal.
⑭ REMOTE terminal	Controls the functions via RS232C.
⑮ FUNC LOCK switch	Locks the switches and control on the front panel. When the FUNC LOCK switch is set to ON, all settings except for the POWER switch ② and the file item of the screen setting menu are locked out.

4. CONNECTION

4.1 An Example of Standard Connection



4.2 Cautions on Connection

- When connecting or disconnecting the camera cables (for the camera head and camera control unit), always turn off the power switch of the camera control unit first. If not, the camera head may be damaged.
- When connecting the camera, always turn off the power of the camera control unit and any other equipment connected.

① Remove the camera head protection cover and mount a lens (option).

② Connect the camera head and the camera control unit with the camera cable (option).

③ Connect the VIDEO (or S-VIDEO) terminal of the camera control unit to a video input terminal of a monitor, etc.

④ Connect a DC power supply (12V) to the DC IN 12V terminal of the camera control unit.

- For DC power supply connecting to DC IN 12V terminal, use Class II DC power supply approved according to EN60950 in Europe.

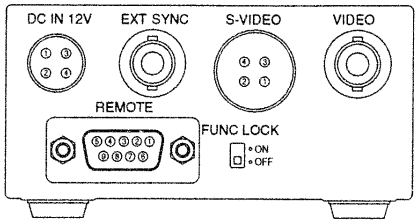
  (Betrieb nur mit zertifiziertem AC-Adapter nach EN60950)

  When camera is used in USA, use UL listed and/or CSA approved ungrounding type AC adaptor with the specifications described below.

Power supply voltage:	DC12V ± 0.5V
Current rating:	More than 800 mA
Ripple voltage:	Less than 50 mV(p-p)
Connector:	HR10A-7P-4S (Hirose)
	Pins 1, 2: ⊕, Pins 3, 4: ⊖

4.3 Connection on Back Panel

The figure below shows the back panel connection terminals of the camera control unit.



4.4 Connector Pin Assignments

DC IN 12V

1	+12V
2	+12V
3	GND
4	GND

S-VIDEO

1	GND
2	GND
3	Y
4	C

REMOTE

1	NC
2	TXD
3	RXD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS
9	NC

* When using the REMOTE terminal, please consult with your dealer.

When connecting a remote cable to the REMOTE terminal, be sure to use a ferrite core attached as a optional kit to the cable.

The diameter of cable which is applicable to use is less than 7 mm.

5. WHEN USING THE CAMERA WITH THE CAMERA UNIT FIXED

The camera control unit can be directly mounted by using M3 screws if the four rubber feet are removed on bottom of the control unit. When mounting directly as described above, do not use longer screws. If the screws enter by more than 5 mm from the control unit mounting surface, they will cause a short-circuit inside the control unit. For details of screw hole locations, refer to the exterior dimensions of the camera control unit.

6. OPERATION

Turn on the POWER switch on the camera control unit and adjust the lens iris and focus while observing a picture on the monitor screen. To obtain the best picture quality, perform various settings.

6.1 AGC (Automatic Gain Control)

Generally, the camera is used with the AGC set to OFF, but when increased camera sensitivity is required, it is set to ON. When more sensitivity is required, "UP" is selected. With the AGC ON, the camera sensitivity approximately doubles, and with the UP selected the sensitivity approximately doubles again, but noise will also increase. We recommend you increase intensity of the lighting to obtain good pictures.

The AGC measurement area is the same as that used for "AREA". (Refer to item 7.5)

6.2 White Balance

A white balance adjustment is necessary to obtain pictures with correct color tone. This camera allows you to select the white balance adjustment of "AUTO", "SET", and "MANU". With the AUTO mode selected, the camera adjusts the white balance automatically. Most shooting will be made in the AUTO mode. The color temperature applicable to this camera is approximately 2500 to 7000K.

	AUTO	SET	MANU
Outline	Camera automatically measures object color temperature and adjusts the white balance.	Adjust white balance by pressing "UP" button on the camera control unit while shooting a white object.	Adjust R (red) and B (blue) levels on the control unit while shooting a white object.
Features	Automatically traces variations of color temperature and adjusts the white balance.	Measurement accuracy is higher than AUTO mode. This mode is effective when shooting under less variations of color temperature.	Measurement accuracy is higher than SET mode. This mode is effective for users desiring specific color temperature, also effective when shooting under the least variations of color temperature.
Notes	Under poor illumination, white balance may not be correct.		Adjustment will be made by viewing monitor or vector scope.

(1) White balance adjustment in modes other than AUTO

(1.1) White balance adjustment in SET mode

① Set the WB switch to "SET" position.

② Shoot a white object to fill entire screen and press the UP button ([▲]) for about 2 sec.

③ When the white balance adjustment completes, the letters "WB SET" blinking at the upper right of the screen changes to "WB OK" and then turns off. If the "WB NG" is displayed, it shows the white balance is out of the adjustment range. This is caused by the object not being white enough, or the video level is set too high or too low even if the white object is shot. Shoot the white object or set the video level correctly.

Note:

- **With the screen menu displayed, the UP button is used for moving the cursor or modifying the data. To activate the SET mode by pressing the UP button, turn off the screen menu.**

(1.2) White balance adjustment in MANU mode

① Set the WB switch to "MANU" position.

② Shoot the white object and adjust the white balance by adjusting the white balance adjust controls "R" and "B" with the screwdriver while observing the monitor or vector scope.

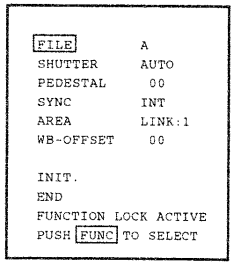
6.3 FUNC LOCK Switch

The FUNC LOCK switch protects settings even if a switch is accidentally pressed after setting. When the FUNC LOCK switch is ON, only the following functions are available.

POWER switch (ON/OFF)

FILE (A/B) in menu

Settings will not be changed even if the other switches are operated. In the menu screen, all except FILE and END are displayed in black letters (white when the FUNC LOCK switch is OFF) and "FUNCTION LOCK ACTIVE" blinks to indicate that the FUNC LOCK switch is ON.



7. MODE SETTING BY ON SCREEN DISPLAY

Setting while monitoring the menu on the monitor screen is possible. The following seven items can be set.

① Scene file
② Electronic shutter (AUTO/MANUAL), backlight correction
③ Pedestal level
④ Phase matching in external synchronization (horizontal/subcarrier synchronization)
⑤ White balance, auto electronic shutter, AGC measurement area
⑥ White balance offset
⑦ Scene file factory setting

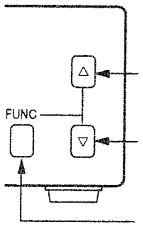
Press the FUNC button to display the menu. The menu appears as shown on the right. Current setting is displayed. Move the cursor to a desired item by moving the cursor up or down using the UP and DOWN buttons, and set an item by pressing the FUNC button. To quit the menu, move the cursor to END and press the FUNC button.

Main Menu

```
FILE          A
SHUTTER       AUTO
PEDESTAL      00
SYNC          INT
AREA          LINK:1
WB-OFFSET     00

INIT.
END

PUSH FUNC TO SELECT
```



UP button: The cursor position or data value goes up.

DOWN button: The cursor position or data value goes down.

FUNC button: Selects the item or data value.

Notes:

- **When setting is changed in the menu screen, be sure to move the cursor to "END" and press the FUNC button to turn off the menu. New setting is stored in the camera.**
- **Don't turn off the POWER switch before turning off the menu. New setting is not stored, and old data remains.**

7.1 FILE (Scene File)

There are two scene files A and B which can be selected according to the shooting state.

① Move the cursor to "FILE" in the main menu using the UP or DOWN button.
② Press the FUNC button to display the contents to set FILE, A or B. Move the cursor to A or B using the UP or DOWN button. Press the FUNC button to set the contents.

Note:

- **The scene file is for the menu screen. The AGC switch and the WB switch are only valid in their set positions.**
- **The new settings are memorized when the POWER is turned off.**

```
FILE          A
SHUTTER       AUTO
PEDESTAL      00
SYNC          INT
AREA          LINK:1
WB-OFFSET     00

INIT.
END

PUSH FUNC TO SELECT
```

```
FILE          A
SHUTTER       B
PEDESTAL
SYNC
AREA
WB-OFFSET

INIT.
END

PUSH FUNC TO SELECT
```

7.2 SHUTTER (Electronic Shutter, Backlight Correction)

The electronic shutter is available in AUTO (auto electronic shutter), 1/50 ~ 1/10000 and SS (synchronized scan).

AUTO: Controls electronic shutter automatically to output the set video level. Can be selected in backlight correction, peak measurement, average measurement and measurement area.

1/50~1/10000: Exposure time can be fixed to any one of 1/50, 1/120, 1/250. 1/500, 1/1000, 1/2000, 1/4000 and 1/10000.

SS: Sets the electronic shutter in horizontal scanning time intervals of 1H.

① Move the cursor to "SHUTTER" in the main menu using the UP or DOWN button.
② Press the FUNC button to display AUTO ~ EXIT to set SHUTTER. Move the cursor to a desired item of AUTO ~ SS using the UP or DOWN buttons. Press the FUNC button to frame a desired item in white.
③ Move the cursor to "EXIT" using the UP or DOWN button. Press the FUNC button. Return to the main menu.

```
FILE          A
SHUTTER       AUTO
PEDESTAL      00
SYNC          INT
AREA          LINK:1
WB-OFFSET     00

INIT.
END

PUSH FUNC TO SELECT
```

```
              AUTO
FILE          1/50
SHUTTER       1/120
PEDESTAL      1/250
SYNC          1/500
AREA          1/1000
WB-OFFSET     1/2000
              1/4000
INIT.         1/10000
END           SS 312/625H
              EXIT
PUSH FUNC TO SUB MENU
```

(1) Detail setting in AUTO mode (auto electronic shutter)

When the FUNC button is pressed after AUTO is selected, the submenu for SHUTTER:AUTO appears. Set details in this screen.

LEVEL: Adjust the auto electronic shutter video level. Larger values indicates brighter level, and vice versa. Data can be set in a range of –30 to +30.

BLC: Correction for backlight. This can be set when the measurement area is set to one of "1/2", "1/8" and "SLIT" for AREA in the main menu. Backlight is corrected at ON, but not at OFF. When the measurement area is "1", BLC is displayed in black letters and setting is impossible.

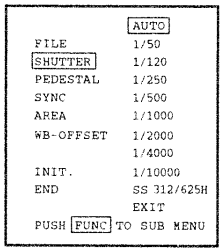
PEAK:AVE: Selects peak or average for measurement of auto electronic shutter video level. The peak to average ratio can be changed in a range of 00:10 to 10:00.

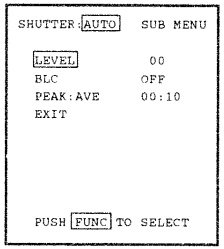
Note:

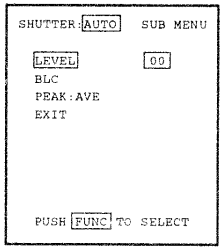
- **While BLC is ON, PEAK:AVE is displayed in black letters and setting is impossible.**

① Move the cursor to a desired item (LEVEL, BLC, PEAK:AVE) using the UP or DOWN button. Press the FUNC button. The cursor moves to the data of the selected item. Set the data by pressing the UP or DOWN button.

② After setting the data, press the FUNC button. The cursor moves to the item. To finish setting of submenu, move the cursor to "EXIT" and press the FUNC button to return to "SHUTTER" in the main menu.







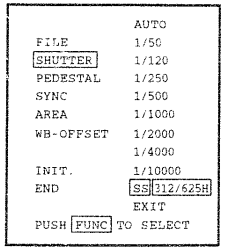
Example of display for LEVEL

(2) SS (synchronized scan)

① Move the cursor to "SS" using the UP or DOWN button. Press the FUNC button. (SS is set.)

② Press the FUNC button. The cursor moves to the data and blinks. The data varies in 1/625H to 312/625H when the UP or DOWN button is pressed. Set a desired data, and press the FUNC button.

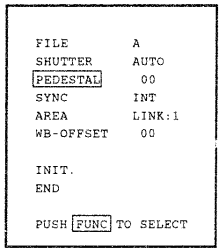
③ Return to "SS" of SHUTTER.

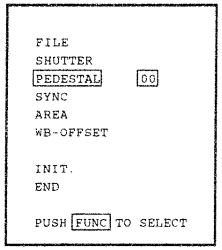


7.3 Pedestal

① Move the cursor to PEDESTAL using the UP or DOWN button.

② Press the FUNC button. The cursor moves to the data. Set the data using the UP or DOWN button. The data can be set in a range of –50 to +50. After setting the data, press the FUNC button to return to the main menu.





7.4 SYNC (Setting for External Synchronization)

This adjusts horizontal phase and subcarrier phase while externally synchronized. INT is displayed for internal synchronization and changed automatically to EXT when the external synchronizing signal is entered.

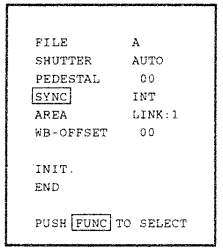
① Move the cursor to "SYNC" using the UP or DOWN button.

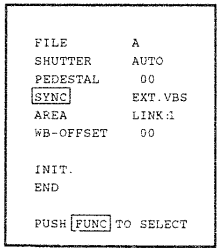
② Press the FUNC button to display the available items (H-PHS, SC-PHS, SC-FINE).

H-PHS: H (horizontal) phase matching 0 ~ 99

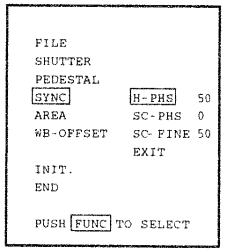
SC-PHS: SC (subcarrier) rough adjustment 0, 90, 180, 270

SC-FINE: SC (subcarrier) fine adjustment 0 ~ 99





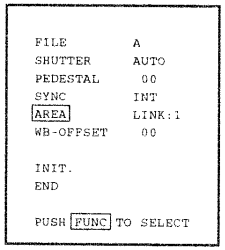
③ Move the cursor to a desired item (H-PHS, SC-PHS, SC-FINE) using the UP or DOWN button. Press the FUNC button and the data is displayed. Set the data using the UP or DOWN button and press the FUNC button to select the data. To return to the main menu, move the cursor to EXIT and press the FUNC button.



Note:

- **If the internal synchronization is set while the SYNC item (H-PHS, SC-PHS, SC-FINE) is being displayed, the display automatically turns to INT, disabling setting.**

7.5 AREA (Measurement Area)

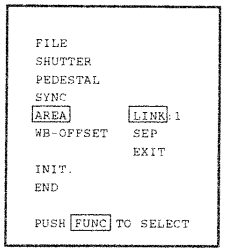


AREA is a measurement AREA item for AGC, auto electronic shutter and white balance. The AREA setting for AGC and auto electronic shutter are the same, so each setting can not be made separately. However, the AREA setting for white balance can be made independently from the AREA setting for AGC and auto electronic shutter.

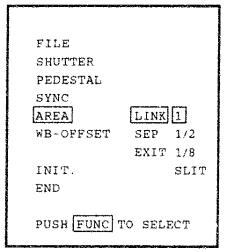
① Move the cursor to AREA using the UP or DOWN button.
② Press the FUNC button to display the available items (LINK, SEP).
③ Move the cursor to a desired item (LINK, SEP) using the UP or DOWN button.

(1) Setting AREA the same for AGC, auto electronic shutter and white balance

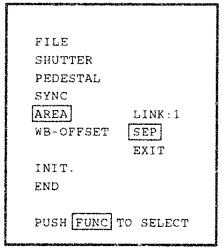
① Move the cursor to LINK using the UP or DOWN button.



② Press the FUNC button to display data 1 ~ SLIT for LINK. Move the cursor to a desired item of AREA data (1, 1/2, 1/8, SLIT) using the UP or DOWN button.
③ Press the FUNC button to set the data.



(2) Setting AREA for white balance separately from the AREA setting for AGC and auto electronic shutter

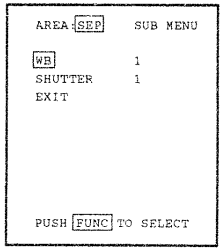


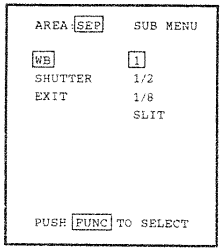
① Move the cursor to SEP using the UP or DOWN button, and press the FUNC button. SEP is selected and framed in white.
② Press the FUNC button to display the submenu.
③ Move the cursor to a desired item using UP or DOWN button.

WB: Measurement AREA for white balance 1, 1/2, 1/8, SLIT
Valid when the WB switch is AUTO and/or SET.

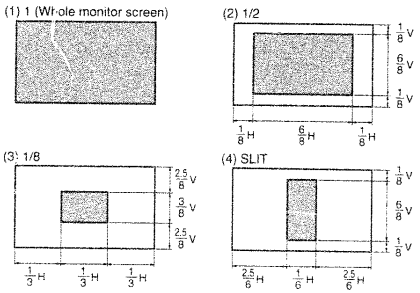
SHUTTER: Measurement AREA for auto electronic shutter and AGC 1, 1/2, 1/8, SLIT

④ Press the FUNC button to select a desired item. The setting data (1, 1/2, 1/8, SLIT) is displayed. Move the cursor to a desired item using UP or DOWN button, then press the FUNC button to select the data.
⑤ The submenu for AREA appears. Move the cursor to EXIT, and press the FUNC button to return to the main menu.





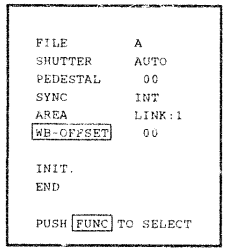
The size of AREA is approximately as shown below.

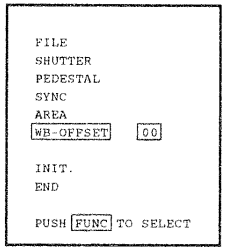


7.6 WB-OFFSET (White Balance Offset)

This offsets the white balance in the direction of orange or cyan when the WB switch is set to "SET".

① Move the cursor to WB-OFFSET using the UP or DOWN button.
② Press the FUNC button. The cursor moves to the data item.
③ Change the data using the UP or DOWN button.
+20 ~ –20
+ Orange direction
– Cyan direction
Press the FUNC button at a desired data value to set the data.

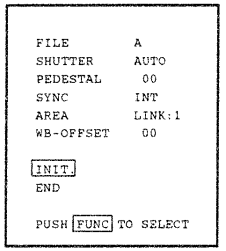


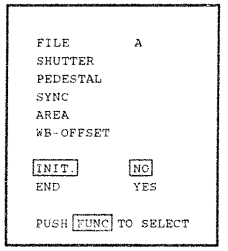


7.7 INIT. (Scene File Initialization)

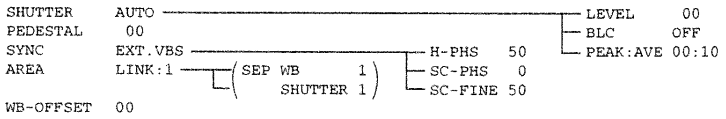
This reset settings of the scene file to the factory setting.

① Select a scene file (A or B) to initialize the setting in FILE.
② Move the cursor to INIT. using the UP or DOWN button.
③ Press the FUNC button. The selected scene file (A or B) is displayed. NO/YES is displayed.
④ Select NO when not initializing. Select YES and press the FUNC button when initializing.



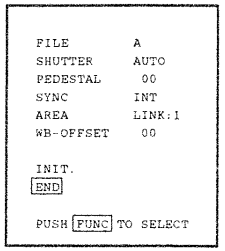


Factory setting (the following setting if INIT. is executed)
The setting is common to scene files A and B.



7.8 END (Ending ON SCREEN DISPLAY)

To turn off the menu, move the cursor to END using the UP or DOWN button and press the FUNC button. To store the setting in the camera, be sure to turn off the display by pressing END. When the display is turned off, the setting is stored in the camera. If the POWER switch is turned off while the menu is being displayed, the setting is not stored and the old data remains.



8 EXTERNAL SYNC

When using the camera with external sync, connect a composite video signal (C-VIDEO) to the EXT SYNC terminal on back of the camera control unit. When the camera accepts external sync, it is automatically switched from the internal sync to the external sync.

(1) External sync signal input conditions

C-VIDEO	:	SYNC section	0.3 ± 0.1V
(75Ω unbalanced)		BURST section	0.3 ± 0.1V

(2) External sync frequency range

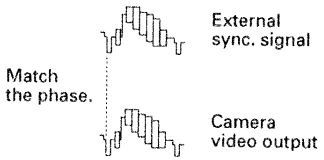
Within ±50 ppm in reference to PAL standard frequency
(H frequency 15624.2 Hz to 15625.8 Hz)

(3) Using the camera with external sync signal

When using more than two cameras in external synchronization, this adjustment allows matching of color tone between two cameras. Adjust H (horizontal) phase and SC (sub carrier) phase if necessary.

(3.1) H (horizontal) phase adjustment

Observe the external sync signal and video output signal on the camera with a dual trace oscilloscope, and adjust "H-PHS" of "SYNC" on the screen menu so that the H phase matches.



(3.2) SC (sub carrier) phase adjustment

Perform a coarse adjustment for 0, 90, 180, or 270 degrees in "SC-PHS" on the screen menu and then perform a fine adjustment with "SC-FINE". Using a vector scope for the phase adjustment will provide more accuracy.

9. CAUTIONS ON USE AND INSTALLATION

- **Carefully handle the units.**
  Do not drop or give a strong shock or vibration to the camera. This may cause problems. Treat the camera cables carefully to prevent cable problems such as cable breakdown and loosened connections.
- **Do not shoot intense light.**
  If there is an intense light at a location on the screen such as a spot light, blooming and smearing may occur.

  Do not aim the camera at the sun. If an intense light enters, vertical stripes may appear on the screen.
- **Lens treatment.**
  Do not look at the sun through the lens.
- **Handling of the camera head and protection cover.**
  Keep the camera head and the protection cover away from children. Children may put them into mouth or swallow them accidentally. The protection cover protects the image sensing plane when the lens is removed from the camera head, do not throw away.
- **Do not touch internal parts.**
  Tampering with the internal parts may cause operation failure or injury.
- **Operating ambient temperature and humidity.**
  Do not use the camera in places where temperature and humidity exceed the specifications. Picture quality will degrade and internal parts may be damaged.
- **Do not splash water.**
  Install the camera in a location free from water splash. If splashed, turn off the camera power switch and stop supplying power, then consult with your dealer.
- **Install the camera in a location free from noise.**
  If the camera or the cables are located near power utility lines or a TV, etc. undesirable noise may appear on the screen. In such a case, try to change the location of the camera or the cable wiring.
- **When not using the camera for a long-time.**
  Turn off the camera power switch and stop supplying power.
- **Should you notice any trouble.**
  If an abnormality occurs such as no picture obtained, turn the camera power switch off and stop supplying power, then consult with the dealer. Using the camera without checking the cause of the trouble may lead to further damage or unexpected accident.
- **When cleaning the camera**
  Always turn off the power and make a cleaning with a piece of dry cloth. If necessary, gently wipe with a cloth dampened with thinned detergent. Do not use benzine, alcohol, thinner, etc. If used, coating and printed letters may be discolored. When cleaning the lens, use a lens cleaning paper, etc.

10. BEFORE MAKING A SERVICE CALL

Symptom	Items to be checked
No picture	• Is the power supplied correctly? • Is the lens iris adjusted correctly? • Are the cables connected correctly?
Poor color	• Is the monitor (TV) adjusted correctly? • Is the white balance of the camera adjusted correctly? (in modes other than automatic trace) • Is the illumination dark? • Is the SC phase adjusted correctly? (External sync)
"HEAD UNCONNECTED" or "CABLE DETECT ERR" is displayed on the screen	• Turn the power of the camera off, make proper connection for the camera head, camera cable, and camera control unit, and then turn the power on again. (Improper connection may cause the trouble.)

11. OPTIONAL PARTS

For further details, call the dealers.

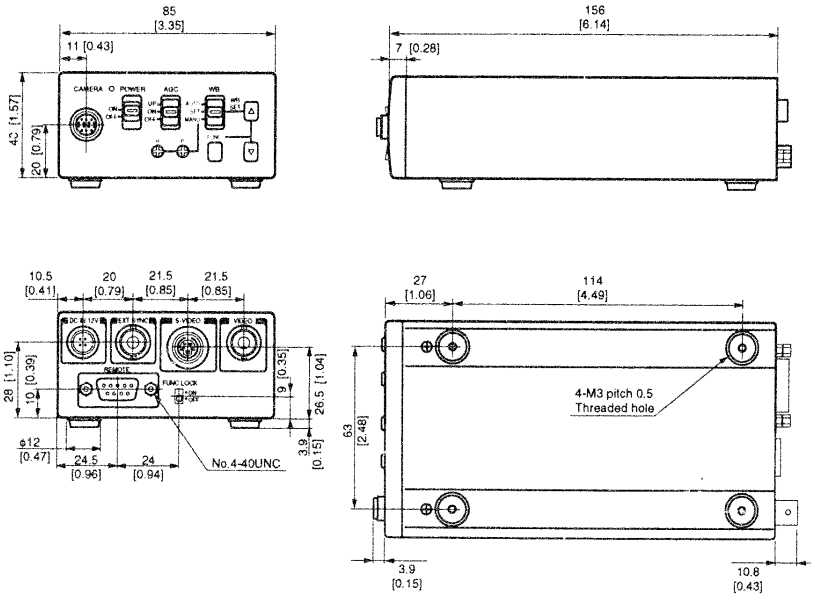
Camera head

Type name	
IK-SM50H	7mm Camera head
IK-M50H	17mm Camera head

12. EXTERIOR DIMENSIONS

Unit : mm [inch]

Camera Control Unit



SECTION 2
ELECTRICAL ADJUSTMENT

1. ELECTRICAL ADJUSTMENT PROCEDURES

<Before Adjustment>

As for the preparation of the adjustments, the required equipments, connection diagrams and initial settings are described in the item 1-1.

The total adjustments containing all adjustment procedures are described in the item 1-2 to overhaul the unit.

Adjust from the beginning to the last step by step. Don't omit any procedure, otherwise the adjustment will be incorrect.

Partial adjustment procedures are shown in the flowchart in the item 1-3. Adjust according to the flowchart, otherwise the adjustment will be incorrect.

1-1. Preparations

1-1-1. Equipment Required

- AC adaptor
- Waveform monitor (WFM)
- Vector scope
- Oscilloscope
- Frequency counter
- Color monitor
- Lights (Halogen lamp 500W x 2)
- Camera adjusting flowchart
  Gray scale chart (PN70909321)
  Color bar chart (PN70909322)
- Camera cable
  EXC-4302 (2m)
  EXC-4312 (12m)

1-1-2. Preparation before Adjustment

<Opening the CCU>

1. Remove all connection cables connected to CCU.
2. Turn over the unit.
3. Remove three screws (2) fixing the unit cover (1).
4. Pull out CCU (3) in the arrow direction.

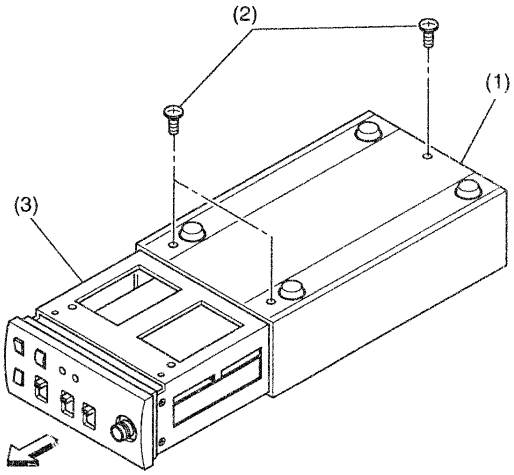


Fig. 1

1-1-3. Equipment Connection Diagram

The equipment connection diagram is shown in Fig. 2.

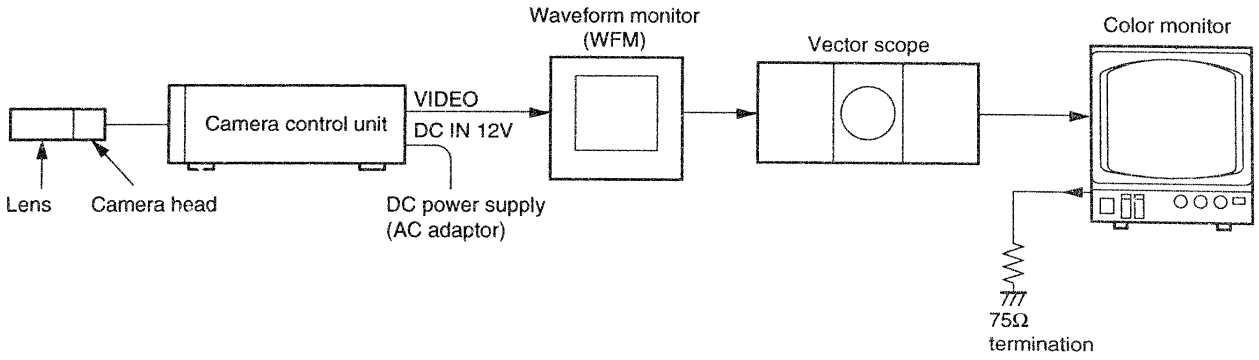


Fig. 2

1-1-4. Initial Setting

1. Perform the warming up for approx. 5 minutes with the POWER switch turned "ON" before performing the adjustments.
2. When the chart is illuminated unevenly, the correct adjustment cannot be performed. So set the light equipments to give an even illumination.

Note: Perform the adjustments in a location with less dust to prevent inside of the camera head from dirty.

1-1-5. Adjusting Locations

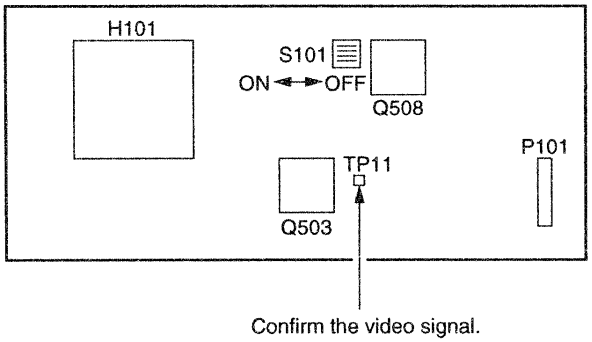


Fig. 3 Main PC board (Component side)

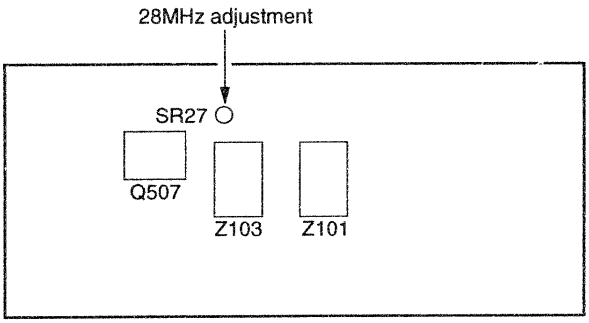


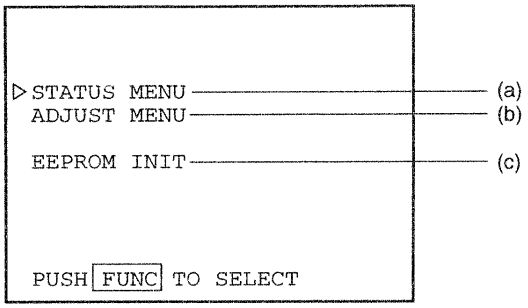
Fig. 4 Main PC board (Soldering side)

Table 1 S101 functions

No.	Functions
1	Test mode ON/OFF
2	Fixed to ON
3	Aperture ON/OFF
4	Gamma ON/OFF

1-1-6. Test Menu (Screen OSD)

1. When displaying the test top menu on the screen, first set pin 1 of S101 to ON and then push the UP and DOWN buttons simultaneously.



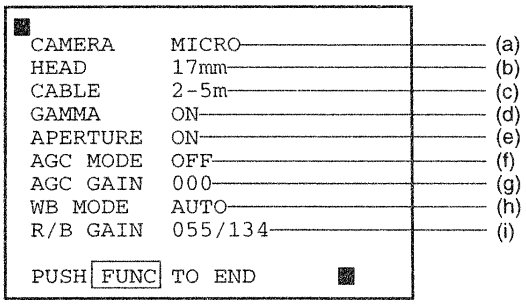
(a) Status display
(b) Adjustment main menu display
(c) Memory initializing menu

Fig. 5 Test top menu

2. When displaying the status of the camera, shift the arrow (▷) to the "STATUS MENU" with the UP and DOWN buttons in the test top menu and then push the FUNC button.

   The content displayed on the screen shows the operation status of the camera.

   When terminating the status menu, push the FUNC button.



(a) Camera name
(b) External diameter of the camera head
(c) Camera cable length
(d) Gamma status
(e) Aperture status
(f) AGC mode
(g) Gain value in the AGC
(h) WB mode
(i) Gain value in the R/B

Fig. 6 Camera status display

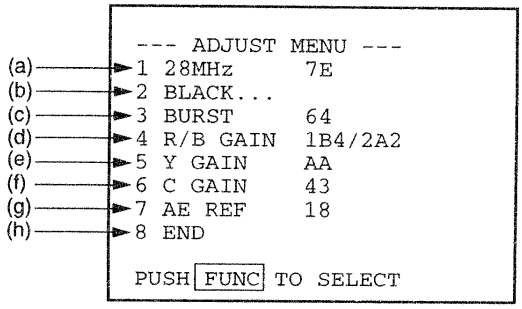
3. When entering the adjustment main menu, shift the arrow (▷) to "ADJUST MENU" with the UP and DOWN buttons in the test top menu and then push the FUNC button.

   When selecting a desired item in the adjustment main menu, shift the arrow (▷) to the item number and then push the FUNC button.

   Change the adjustment value of each item with the UP and DOWN buttons and push the FUNC button to select the value. (The selected value is stored in the camera memory.)

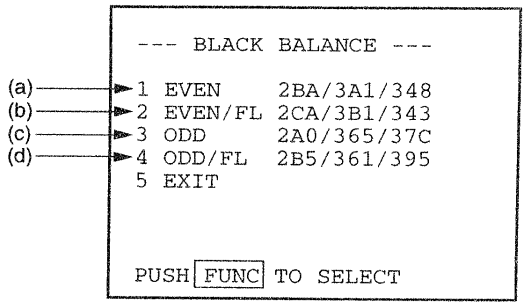
   When terminating the adjustment menu, shift the arrow (▷) to "8. END" and then push the FUNC button.

Note: The "BLACK ..." (Black balance adjustment) in the menu item 2 is carried out in the sub menu. The sub menu is returned to the adjustment main menu when EXIT is pushed. (Fig. 8)



(a) 28 MHz adjustment
(b) Black balance adjustment
(c) Burst level adjustment
(d) White balance adjustment
(e) Y gain adjustment
(f) Color gain adjustment
(g) Electronic shutter standard adjustment
(h) Menu ends

Fig. 7 Adjustment main menu



(a) Cable EVEN adjustment
(b) Cable EVEN/FL adjustment
(c) Cable ODD adjustment
(d) Cable ODD/FL adjustment

Fig. 8 Black balance adjustment menu (Sub menu)

4. When initializing the memory of the camera to the same setting as the factory shipping status, shift the arrow (▷) to "EEPROM INIT" with the UP and DOWN buttons in the test top menu. Then push the FUNC button to display the memory initializing menu on the screen. (Fig. 9)

   Set the cursor to YES with the UP and DOWN buttons and push the FUNC button. The camera is restarted and the memory is initialized.

Note: In above memory initialization, the adjustment data in the memory is not initialized.

   The contents of files A and B are initialized.

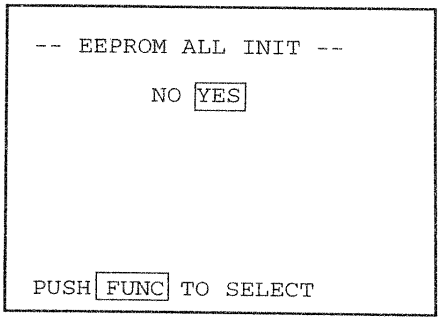


Fig. 9 Memory initializing menu

1-2. Total Adjustments

The adjustments are required when the unit is overhauled.

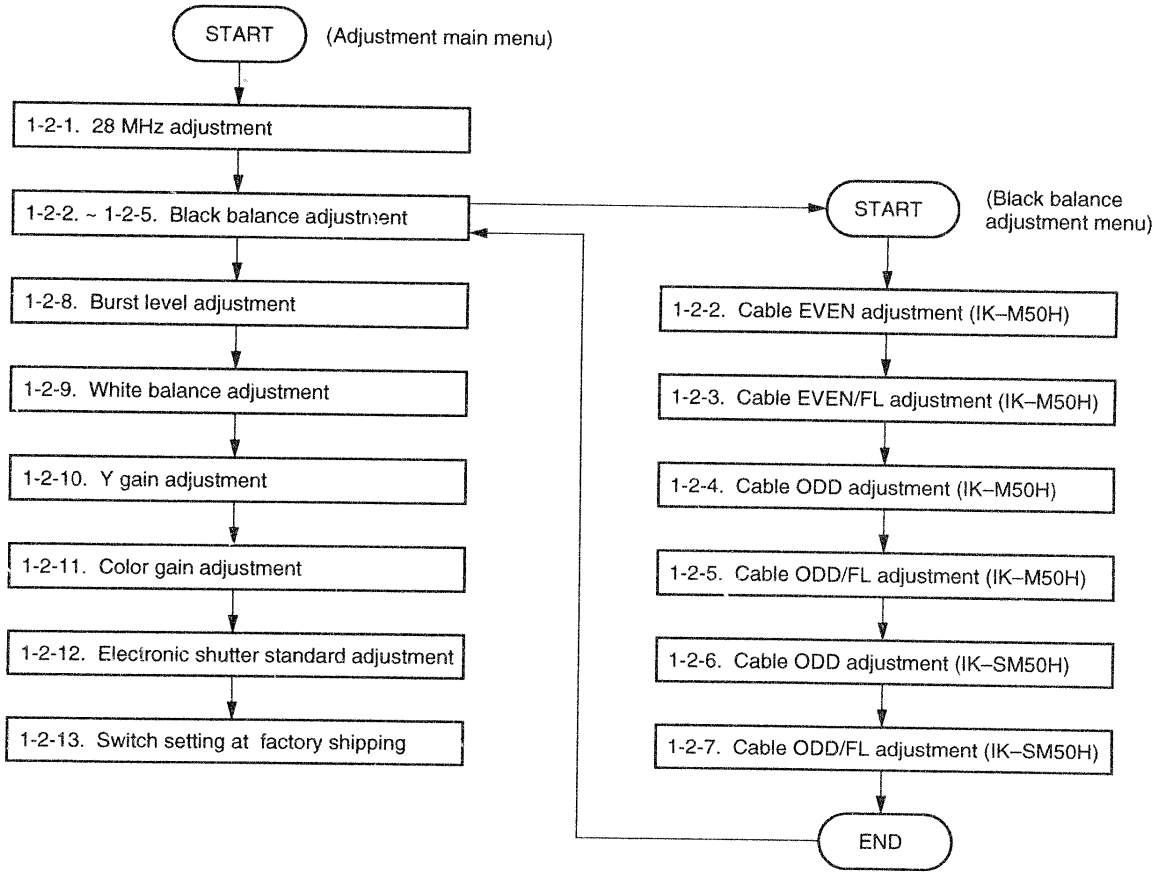
Be sure to perform the adjustments from the beginning to the last. When performing some adjustments separately, perform the adjustments following to the flowchart shown in the item 1-3.

When performing the adjustments;

1. Set the FUNC LOCK switch to OFF.
2. Set the pin 1 of S101 (test mode) on the main PC board to ON and the camera enters the adjustment mode. (Confirm pins 3 and 4 are set to ON. If not, set to ON.)
3. Initialize the memory of the camera in the memory initializing menu. (Refer to step 4 of item 1-1-6.)
4. Display the adjustment main menu and shift the arrow (>) to the adjustment item to select with the UP and DOWN buttons. Then select the item with the FUNC button. (Refer to item 1-1 (6), 3.)

Perform the adjustments using the UP and DOWN buttons according to the flow chart shown below.

<Flowchart>


START
(Adjustment main menu)
1-2-1. 28 MHz adjustment
1-2-2. ~ 1-2-5. Black balance adjustment
1-2-8. Burst level adjustment
1-2-9. White balance adjustment
1-2-10. Y gain adjustment
1-2-11. Color gain adjustment
1-2-12. Electronic shutter standard adjustment
1-2-13. Switch setting at factory shipping
START
(Black balance adjustment menu)
1-2-2. Cable EVEN adjustment (IK-M50H)
1-2-3. Cable EVEN/FL adjustment (IK-M50H)
1-2-4. Cable ODD adjustment (IK-M50H)
1-2-5. Cable ODD/FL adjustment (IK-M50H)
1-2-6. Cable ODD adjustment (IK-SM50H)
1-2-7. Cable ODD/FL adjustment (IK-SM50H)
END

Note:
Use the camera cables described in the table 2 when using the cable in the black balance adjustments 1-2-2 ~ 1-2-5.

Table 2 Camera cables for the black balance adjustment

Adjustment item	Camera head (IK-M50H)	Camera head (IK-SM50H)
1-2-2. Cable EVEN adjustment 1-2-3. Cable EVEN/FL adjustment	12m (30m) EXC-4312	
1-2-4. Cable ODD adjustment 1-2-5. Cable ODD/FL adjustment	2m (3m, 5m, 20m) EXC-4302	
1-2-6. Cable ODD adjustment 1-2-7. Cable ODD/FL adjustment		IK-SM50H

1-2-1. 28 MHz Adjustment

Screen display: 128 MHz (Adjustment main menu)
Test equipment: Frequency counter
Test point: SR27 (Soldering side of main PC board)
Adjusting point: UP/DOWN buttons
Specification: 28.50000 MHz ± 200 Hz

Note: External sync mode is not set.

1. Adjust the camera to obtain the value within the specification with the UP/DOWN buttons.
2. Push the FUNC button after the data is determined.

1-2-2. Cable EVEN adjustment (IK-M50H)

Screen display: 1 EVEN
Test equipment: Vector scope (MAX GAIN)
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Cut the light from the lens.
2. Shift the arrow (▷) to 1 EVEN in the black balance adjustment menu. Push the FUNC button and display the cursor at the first data position. Then, set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
3. After the data is selected in the step 2 above, push the FUNC button. Shift the cursor to the second data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
4. After the data is selected in the step 3 above, push the FUNC button. Shift the cursor to the third data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons. After the data is determined, push the FUNC button.
5. Repeat the steps 2, 3 and 4 to set the luminance spot of the vector scope at its center.

Note: Use the camera cable specified in the table 2.

1-2-3. Cable EVEN/FL adjustment (IK-M50H)

Screen display: 2 EVEN/FL (Black balance adjustment menu)
Test equipment: Vector scope (MAX GAIN)
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Shut out the light from the lens.
2. Shift the arrow (▷) to 2 EVEN/FL in the black balance adjustment menu. Push the FUNC button and display the cursor at the first data position. Then, set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
3. After the data is selected in the step 2 above, push the FUNC button. Shift the cursor to the second data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
4. After the data is selected in the step 3 above, push the FUNC button. Shift the cursor to the third data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons. After the data is selected, push the FUNC button.
5. Repeat the steps 2, 3 and 4 to set the luminance spot of the vector scope at its center.

Note: Use the camera cable specified in the table 2.

1-2-4. Cable ODD adjustment (IK-M50H)

Screen display: 3 ODD (Black balance adjustment menu)
Test equipment: Vector scope (MAX GAIN)
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Shut out the light from the lens.
2. Shift the arrow (▷) to 3 ODD in the black balance adjustment menu. Push the FUNC button and display the cursor at the first data position. Then, set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
3. After the data is selected in the step 2 above, push the FUNC button. Shift the cursor to the second data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
4. After the data is selected in the step 3 above, push the FUNC button. Shift the cursor to the third data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons. After the data is determined, push the FUNC button.
5. Repeat the steps 2, 3 and 4 to set the luminance spot of the vector scope at its center.

Note: Use the camera cable specified in the table 2.

1-2-5. Cable ODD/FL adjustment (IK-M50H)

Screen display: 4 ODD/FL (Black balance adjustment menu)
Test equipment: Vector scope (MAX GAIN)
Test point: Video out
Adjusting point: UP/DOWN buttons

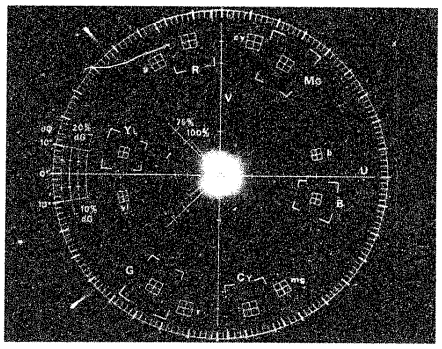
1. Shut out the light from the lens.
2. Shift the arrow (▷) to 4 ODD/FL in the black balance adjustment menu. Push the FUNC button and display the cursor at the first data position. Then, set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
3. After the data is selected in the step 2 above, push the FUNC button. Shift the cursor to the second data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
4. After the data is selected in the step 3 above, push the FUNC button. Shift the cursor to the third data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons. After the data is selected, push the FUNC button.
5. Repeat the steps 2, 3 and 4 to set the luminance spot of the vector scope at its center.
6. Exit from the menu by selecting "5 EXIT" and turn off the switch.

Note: Use the camera cable specified in the table 2.

```
 --- BLACK BALANCE ---

▷1 EVEN    [28A]/3A1/348
  2 EVEN/FL 2CA/3B1/343
  3 ODD     2A0/365/37C
  4 ODD/FL  2B5/361/395
  5 EXIT


 PUSH[FUNC] TO SELECT
```



1-2-6. Cable ODD adjustment (IK-SM50H)

Screen display: 3 ODD (Black balance adjustment menu)
Test equipment: Vector scope (MAX GAIN)
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Connect IK-SM50H, turn on the power and display the BLACK BALANCE menu.
2. Shut out the light from the lens.
3. Shift the arrow (▷) to 3 ODD in the black balance adjustment menu. Push the FUNC button and display the cursor at the first data position. Then, set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
4. After the data is selected in the step 2 above, push the FUNC button. Shift the cursor to the second data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
5. After the data is selected in the step 3 above, push the FUNC button. Shift the cursor to the third data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons. After the data is determined, push the FUNC button.
6. Repeat the steps 2, 3 and 4 to set the luminance spot of the vector scope at its center.

Note: Use the camera cable specified in the table 2.

1-2-7. Cable ODD/FL adjustment (IK-SM50H)

Screen display: 4 ODD/FL (Black balance adjustment menu)
Test equipment: Vector scope (MAX GAIN)
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Shut out the light from the lens.
2. Shift the arrow (▷) to 4 ODD/FL in the black balance adjustment menu. Push the FUNC button and display the cursor at the first data position. Then, set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
3. After the data is selected in the step 2 above, push the FUNC button. Shift the cursor to the second data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons.
4. After the data is selected in the step 3 above, push the FUNC button. Shift the cursor to the third data position. Then set the luminance spot of the vector scope at its center with the UP/DOWN buttons. After the data is selected, push the FUNC button.
5. Repeat the steps 2, 3 and 4 to set the luminance spot of the vector scope at its center.
6. Exit from the menu by selecting "5 EXIT" and turn off the switch.
7. Remove IK-SM50H from the equipment and change the camera head and cable to those for IK-M50H used in item 1-2-5.

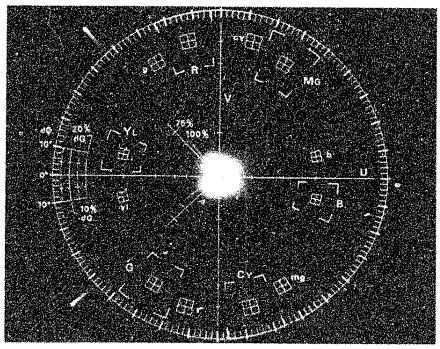
Note: Use the camera cable specified in the table 2.

```
--- BLACK BALANCE ---

▷1 EVEN     [28A]/3A1/348
  2 EVEN/FL 2CA/3B1/343
  3 ODD     2A0/365/37C
  4 ODD/FL  2B5/361/395
  5 EXIT



 PUSH [FUNC] TO SELECT
```



1-2-8. Burst Level

Screen display: 3 BURST (Adjustment main menu)
Test equipment: WFM (BPF MODE), Vector scope
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Adjust the burst level to 75% position of the vector scope with the UP/DOWN buttons. Or, adjust the burst level of the waveform monitor to 40 ± 2 IRE with the UP/DOWN buttons.
2. After the data is selected, push the FUNC button.

1-2-9. White Balance Adjustment

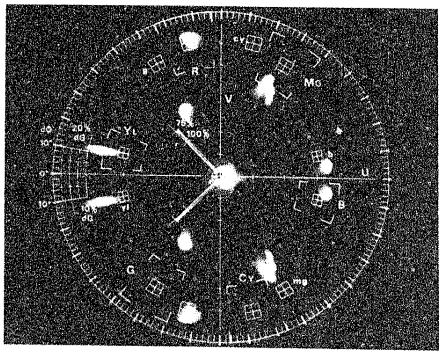
Screen display: 4R/B GAIN (Adjustment main menu)
Test equipment: Vector scope
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Shoot the color bar chart fully on the screen.
2. Adjust the white level within 100 ± 3 IRE by the lens iris.

Note: Adjust the white level at the screen center.

3. Shift the arrow (▷) to 4 R/B GAIN in the adjustment main menu and display the cursor at the R GAIN data. Adjust the white of the vector scope at its center with the UP/DOWN buttons.
4. After the data is selected, push the FUNC button. Shift the cursor to B GAIN data and set the white luminance spot at its center with the UP/DOWN buttons.

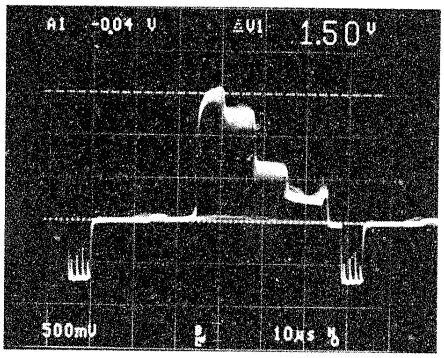
   After the data is selected, push the FUNC button.
5. Repeat the steps 3 and 4 to set the white luminance point at its center.

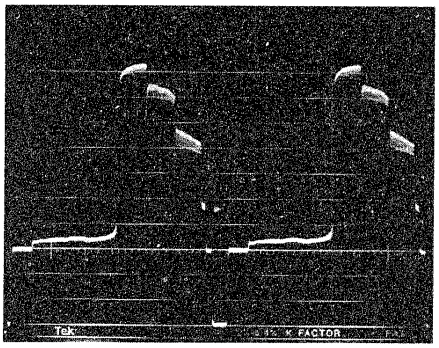


1-2-10. Y GAIN adjustment

Screen display: 5 Y GAIN
(Adjustment main menu)
Test equipment: Oscilloscope,
WFM (LPF mode)
Test point: TP11 (Component side of main PC board), Video out
Adjusting point: UP/DOWN buttons

1. Shoot the color bar chart to set the white at its center of the oscilloscope.
2. Adjust the white level at TP11 to 1.5 ± 0.05V.
3. Adjust the white level of the video out to 100 ± 2 IRE with the UP/DOWN button.
4. When the data is selected, push the FUNC button.





1-2-11. Color Gain Adjustment

Screen display: 6 C GAIN
(Adjustment main menu)
Test equipment: WFM (LPF mode),
Vector scope
Test point: Video out
Adjusting point: UP/DOWN buttons

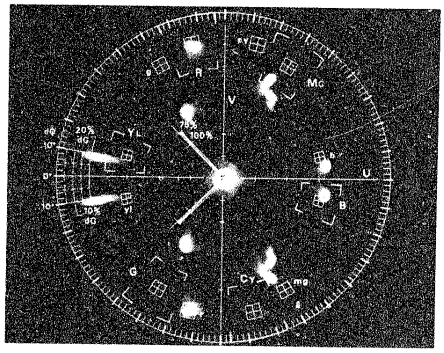
1. Shoot the color bar chart fully on the screen.
2. Set the white level to 100 ± 2 IRE by the lens iris.

Note: Adjust the white level at the screen center.

3. Adjust the R luminance spot to set it within the mark ⊞ with the UP/DOWN buttons.

Note: Shoot the color bar chart to set the red level to the center of the screen.

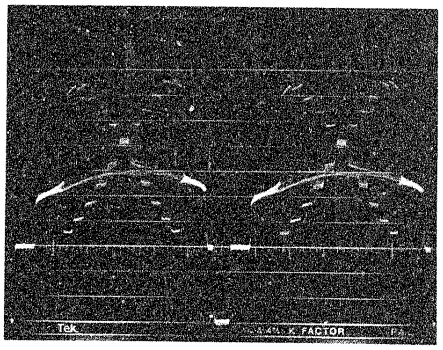
4. When the data is selected, push the FUNC button.



1-2-12. Electronic shutter standard adjustment

Screen display: 7 AF REF
(Adjustment main menu)
Test equipment: WFM (LPF MODE)
Test point: Video out
Adjusting point: UP/DOWN buttons

1. Shoot the color bar chart fully on the screen.
2. Release the lens iris.
3. Adjust the white level to 100 ± 2 IRE with the UP/DOWN buttons.
4. When the data is selected, push the FUNC button.



1-2-13. Setting at Shipping

Pin 1 of S101 : OFF
Pin 2 of S101 : ON
Pin 3 of S101 : OFF
Pin 4 of S101 : OFF

POWER (FRONT) : OFF
AGC (FRONT) : OFF
WB (FRONT) : AUTO
FUNC LOCK (REAR) : OFF
R control (FRONT) : Mechanical center
B control (FRONT) : Mechanical center

1-3. Partial Adjustments

In this chapter, the adjustments required relatively frequently are selected and associated items to be checked previously or to be adjusted before or after the adjustments are given in the flowchart below.

Be sure to perform the adjustments following to the flowchart.

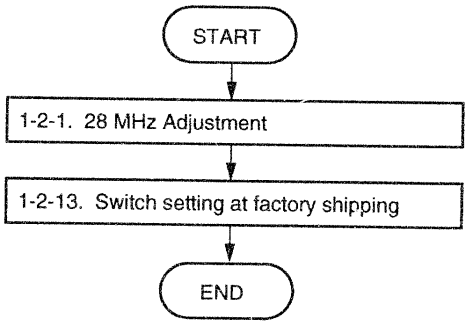
In addition, when performing the adjustments, set the FUNC LOCK switch of the camera to OFF, pin 1 of S101 on the main PC board to ON and then initialize the memory of the camera in the same way as the item 1-2 "Total adjustment".

Items shown within the frame:

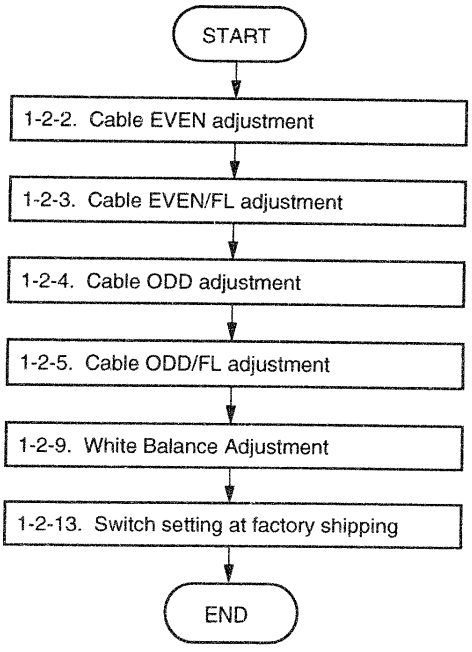
Confirm and adjust if the specification is out of its range.

This adjustment is always required.

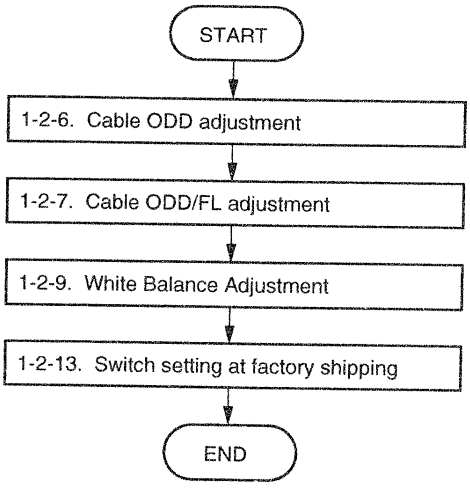
1-3-1. 28 MHz Adjustment



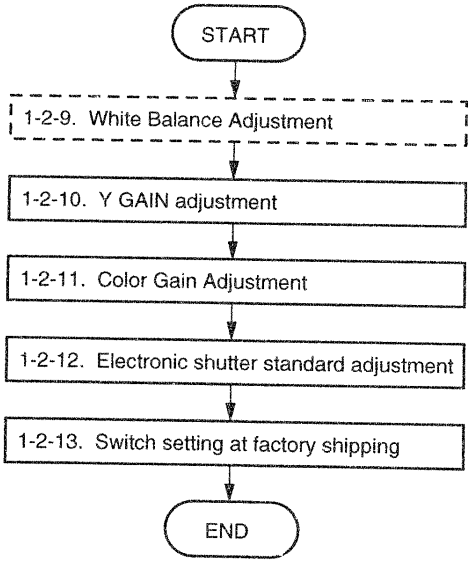
1-3-2. Black Balance/White Balance Adjustment (IK-M50H)



1-3-3. Black Balance/White Balance Adjustment (IK-SM50H)



1-3-4. Color Bar Adjustment



SECTION 3
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

The parts identified by ⚠ mark are critical for safety. Replace only with part number specified.
The mounting position of replacement is to be identical with originals.
The substitute replacement parts which do not have the same safety characteristics are specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.
Parts marked # are of chip type and mounted on original PC boards.
However, when they are placed for servicing works, use discrete parts listed on the parts list.

ABBREVIATIONS

1. **Integrated Circuit (IC)**
2. **Capacitor (Cap)**
   - **Unit**

     F ..... farad
     μF ..... microfarad (μF = 10^{-6} F)
     pF ..... picofarad (pF = 10^{-6} μF = 10^{-12} F)

   - **Capacitance Tolerance (for Nominal Capacitance more than 10pF)**

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20	± 30

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	+ 100 0	+ 30 −10	+ 50 −10	+ 75 −10	+ 20 −10	+ 100 −10	+ 40 −20	+ 150 −10	+ 80 −20

Ex. 10μF J = 10μF ± 5%

   - **Capacitance Tolerance (for Nominal Capacitance 10pF or less)**

Symbol	B	C	D	F	G
Tolerance pF	± 0.1	± 0.25	± 0.5	± 1	± 2

Ex. 10pF G = 10pF ± 2pF

3. **Resistor (Res)**
   - **Unit**

     No Mark ..... Ω
     k ..... kΩ
     M ..... MΩ
     W ..... Watt

     Ex.
     10 ..... 10Ω
     10k 10kΩ
     10M 10MΩ
     1W ..... 1 Watt

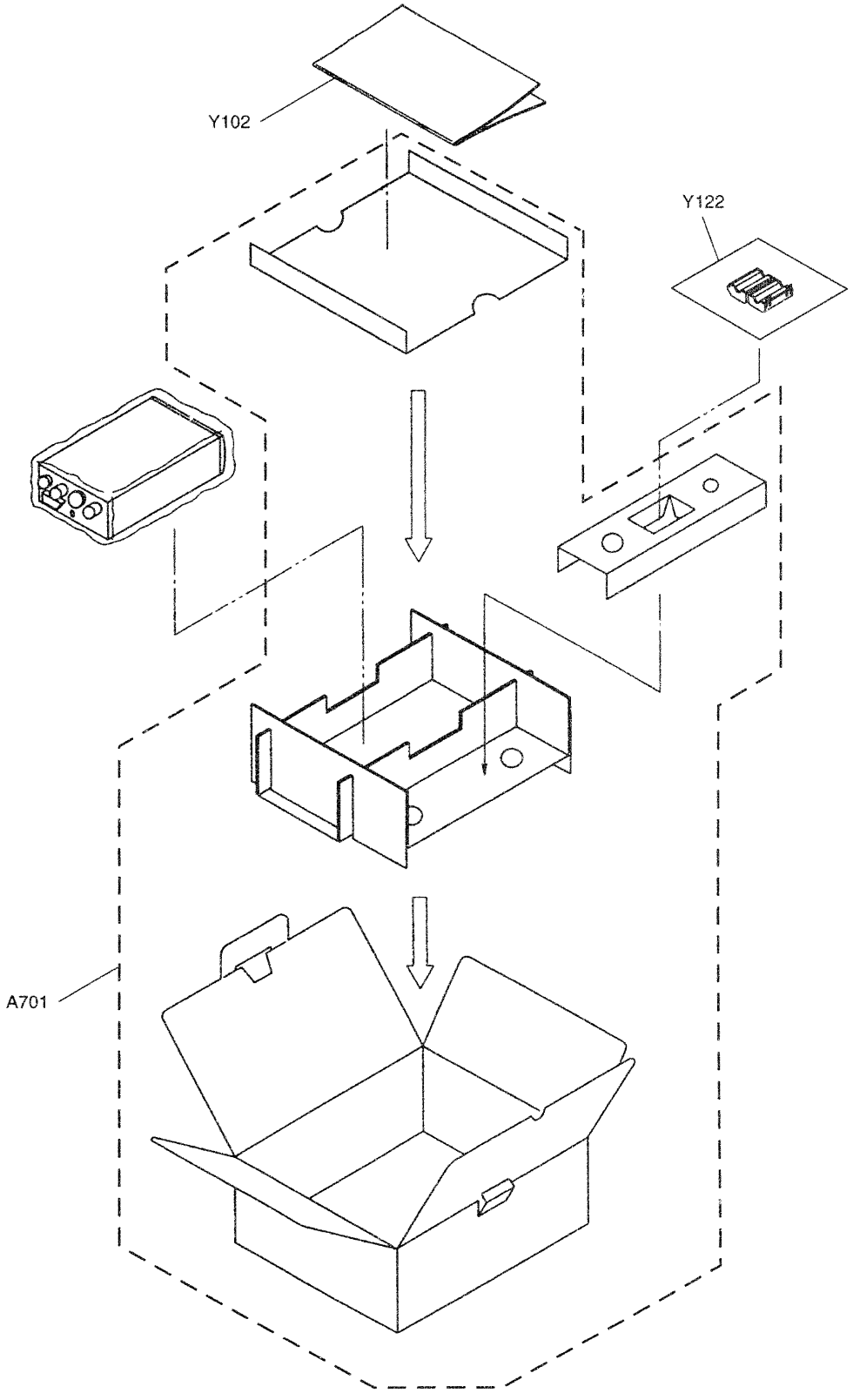
   - **Resistance Tolerance**

Symbol	B	C	D	F	G	J	K	M
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20

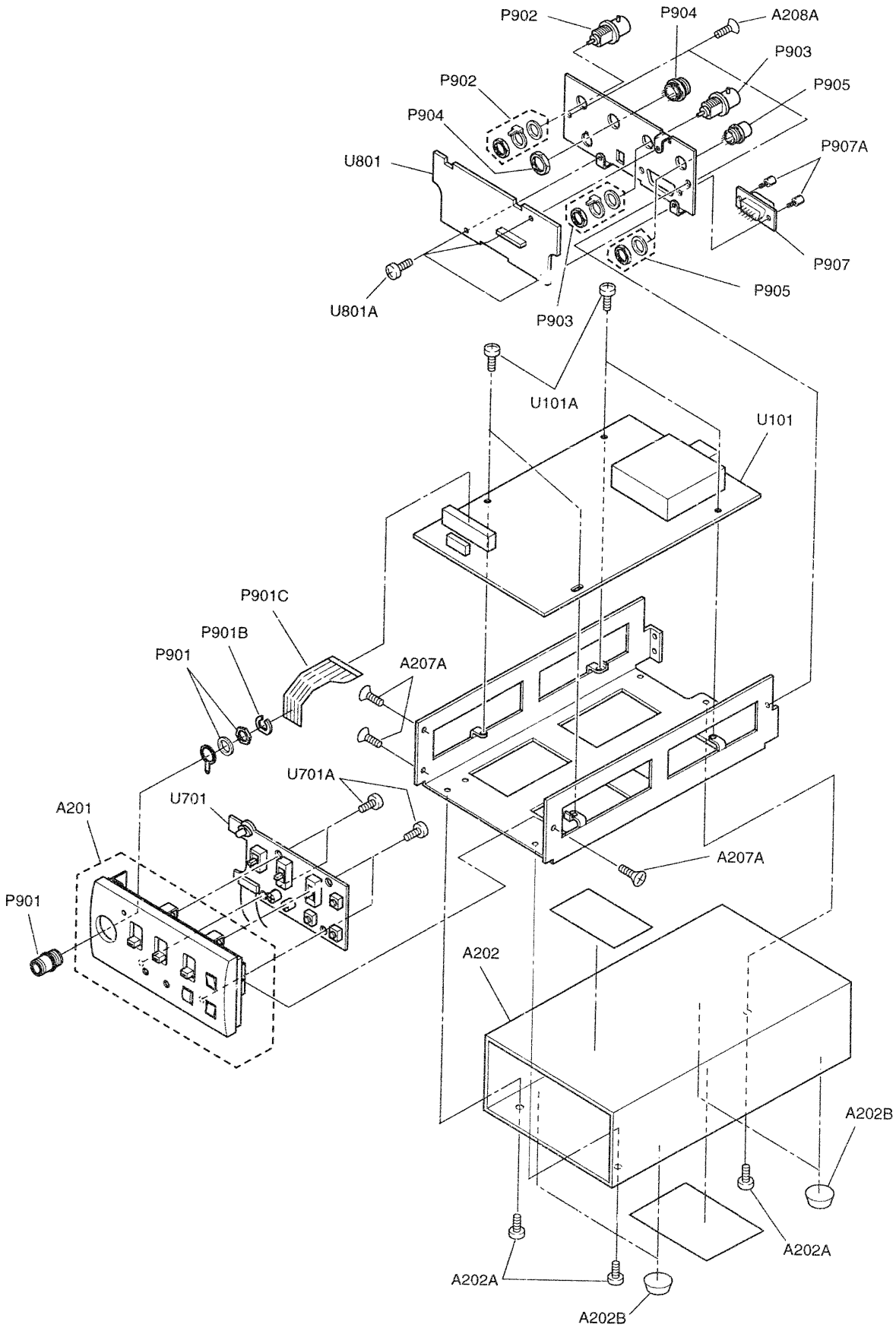
Ex. 470 J = 470Ω ± 5%

1. EXPLODED VIEWS

1-1. Packing Assembly



1-2. Chassis Assembly



2. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		-ELECTRICAL PARTS-	
■U101	70186899	P C Board Assy	MAIN(PB7490)
		-ICS-	
Q501	70200422	IC	HA118184F
Q502	70200424	IC	HD49319F
Q505	70200150	IC	CXD1267AN
Q506	70129158	IC	MN56050TAF
Q507	70200426	IC	MN56030Y3A
Q508	70200693	IC, Exclusive	HD6473337YF16
Q509	A6030883	IC	TC7W08FU
Q510	B0489760	IC	TC74VHC32FS
Q512	70200092	IC	NJM2268V
Q513	B0488821	IC	TC74AC04FS
Q514	B0488821	IC	TC74AC04FS
Q515	B0489644	IC	TC74VHC00FS
Q516	A6030649	IC	TC7S32FU
Q517	A6030883	IC	TC7W08FU
Q518	B0487182	IC	TC74VHC175FS
Q519	B0489517	IC	TC74VHC161FS
Q520	B0487182	IC	TC74VHC175FS
Q521	A6030665	IC	TC7S08FU
Q522	A6030858	IC	TC7W00FU
Q523	B0485272	IC	TC74VHC04FS
Q524	70129734	IC	MC74HC4046AF
Q525	23319021	IC	LA7213
Q526	70200432	IC	74VHC123AMSC
Q527	70200006	IC	NJM062V
Q528	70129347	IC	MB88346BPFV
Q529	A6030629	IC	TC7S04FU
Q530	A6030791	IC	TC7W74FU
Q531	70200127	IC	μPD4721GS
Q532	70200430	IC	RN5VD27A
Q533	70200429	IC	AK93C65LV
Q534	70200428	IC	PD6462GS
Q535	A6030893	IC	TC7W32FU
Q536	70129738	IC	PQ20VZ1U
Q537	A6030898	IC	TC4W53FU
Q538	70200650	IC	EPM7064TC44
Q539	B0489621	IC	TC74VHC157FS
Q540	B0489621	IC	TC74VHC157FS
		-TRANSISTORS-	
Q101	23314894	Transistor,Chip	XN5531
Q102	A6549570	Transistor,Chip	2SA1586-Y
Q103	23314923	Transistor,Chip	XN4312
Q104	A6549570	Transistor,Chip	2SA1586-Y
Q105	23314507	Transistor,Chip	2SC3931-C
Q106	23314889	Transistor,Chip	UMT2N
Q107	A6549570	Transistor,Chip	2SA1586-Y
Q108	A6063920	Transistor,Chip	2SK880-Y
Q109	23314888	Transistor,Chip	UMZ1N
Q110	A6063920	Transistor,Chip	2SK880-Y
Q111	A6365620	Transistor,Chip	2SC4116-Y
Q112	23314558	Transistor,Chip	2SA1610
Q113	23314925	Transistor,Chip	UMX1N
Q114	70114329	Transistor,Chip	μPA673T
Q115	23314507	Transistor,Chip	2SC3931-C
Q116	A6549570	Transistor,Chip	2SA1586-Y
Q117	A6063920	Transistor,Chip	2SK880-Y
Q118	A6063920	Transistor,Chip	2SK880-Y
Q119	A6063920	Transistor,Chip	2SK880-Y
Q129	A6549570	Transistor,Chip	2SA1586-Y
Q132	A6365620	Transistor,Chip	2SC4116-Y
Q133	23314925	Transistor,Chip	UMX1N
Q134	23314888	Transistor,Chip	UMZ1N
Q135	23314924	Transistor,Chip	XP1501
Q136	A6365620	Transistor,Chip	2SC4116-Y
Q137	23314888	Transistor,Chip	UMZ1N
Q138	23314888	Transistor,Chip	UMZ1N
		-DIODES-	
D101	A7154100	Diode,Chip	1SS302
D102	23118041	Diode,Chip	MA111
D103	A7154050	Diode,Chip	1SS301
D104	23118041	Diode,Chip	MA111
D106	23118041	Diode,Chip	MA111
D111	23118041	Diode,Chip	MA111
		-COILS-	
L101	23245847	Coil,Chip	33μH
L102	23245847	Coil,Chip	33μH
L103	23245858	Coil,Chip	10μH
L104	23245858	Coil,Chip	10μH
L105	23245847	Coil,Chip	33μH
L106	23245847	Coil,Chip	33μH
L107	23245847	Coil,Chip	33μH
L108	23245847	Coil,Chip	33μH
L109	23245710	Coil,Chip	12μH
L111	23245858	Coil,Chip	10μH
L112	23245847	Coil,Chip	33μH
L113	23245847	Coil,Chip	33μH
L114	23245858	Coil,Chip	10μH
L115	23245847	Coil,Chip	33μH
L116	23245847	Coil,Chip	33μH
L117	23245858	Coil,Chip	10μH
L118	23245858	Coil,Chip	10μH
L119	23245717	Coil,Chip	47μH
		-CAPACITORS-	
C101	24088952	Cap,Chip,Tantalum	15μF M 16V
C102	24088979	Cap,Chip,Tantalum	1μF M 25V
C103	24105220	Cap,Chip,Ceramic	22pF J 50V
C104	24100104	Cap,Chip	0.1μF Z 25V
C105	24100104	Cap,Chip	0.1μF Z 25V
C106	24100104	Cap,Chip	0.1μF Z 25V
C107	24105220	Cap,Chip,Ceramic	22pF J 50V
C108	24105220	Cap,Chip,Ceramic	22pF J 50V
C109	24088080	Cap,Chip,Tantalum	33μF M 10V
C110	24092538	Cap,Chip	1μF Z 10V
C111	24088080	Cap,Chip,Tantalum	33μF M 10V
C112	24088079	Cap,Chip,Tantalum	10μF M 10V
C113	24100104	Cap,Chip	0.1μF Z 25V
C114	24088079	Cap,Chip,Tantalum	10μF M 10V
C115	24088080	Cap,Chip,Tantalum	33μF M 10V
C116	24088080	Cap,Chip,Tantalum	33μF M 10V
C117	24088080	Cap,Chip,Tantalum	33μF M 10V
C118	24100104	Cap,Chip	0.1μF Z 25V
C119	24100104	Cap,Chip	0.1μF Z 25V
C120	24100104	Cap,Chip	0.1μF Z 25V
C121	24100104	Cap,Chip	0.1μF Z 25V
C122	24100104	Cap,Chip	0.1μF Z 25V
C123	24619102	Chip,Chemicon	47μF M 16V
C125	24088952	Cap,Chip,Tantalum	15μF M 16V
C126	24088088	Cap,Chip,Tantalum	47μF M 20V
C127	24088082	Cap,Chip,Tantalum	1μF M 35V
C128	24100104	Cap,Chip	0.1μF Z 25V
C129	24100104	Cap,Chip	0.1μF Z 25V
C130	24100104	Cap,Chip	0.1μF Z 25V
C131	24100104	Cap,Chip	0.1μF Z 25V
C132	24100104	Cap,Chip	0.1μF Z 25V
C133	24088089	Cap,Chip,Tantalum	100μF M 10V
C134	24100104	Cap,Chip	0.1μF Z 25V
C136	24100104	Cap,Chip	0.1μF Z 25V
C138	24100104	Cap,Chip	0.1μF Z 25V
C139	24105270	Cap,Chip,Ceramic	27pF J 50V
C140	24100104	Cap,Chip	0.1μF Z 25V
C141	24100104	Cap,Chip	0.1μF Z 25V
C142	24000445	Res,Chip Jumper	0
C143	24100104	Cap,Chip	0.1μF Z 25V
C144	24000445	Res,Chip Jumper	0
C146	24000445	Res,Chip Jumper	0
C147	24105101	Cap,Chip,Ceramic	100pF J 50V
C149	24296104	Cap,Chip,Tantalum	0.1μF M 35V
C152	24100104	Cap,Chip	0.1μF Z 25V
C153	24100104	Cap,Chip	0.1μF Z 25V
C154	24100104	Cap,Chip	0.1μF Z 25V
C155	24088078	Cap,Chip,Tantalum	15μF M 6.3V
C156	24619100	Chip Chemicon	10μF M 16V
C157	24088979	Cap,Chip,Tantalum	1μF M 25V
C158	24100104	Cap,Chip	0.1μF Z 25V
C159	24105101	Cap,Chip,Ceramic	100pF J 50V
C160	24100104	Cap,Chip	0.1μF Z 25V
C161	24100104	Cap,Chip	0.1μF Z 25V
C162	24100104	Cap,Chip	0.1μF Z 25V
C163	24100104	Cap,Chip	0.1μF Z 25V
C164	24100104	Cap,Chip	0.1μF Z 25V
C165	24100104	Cap,Chip	0.1μF Z 25V
C166	24109681	Cap,Chip,Ceramic	680pF K 50V
C167	24105180	Cap,Chip,Ceramic	18pF J 50V
C168	24088079	Cap,Chip,Tantalum	10μF M 10V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C169	24100104	Cap, Chip	0.1 μF	Z 25V
C170	24100333	Cap, Chip, Ceramic	0.033 μF	Z 25V
C171	24100104	Cap, Chip	0.1 μF	Z 25V
C172	24092538	Cap, Chip	1 μF	Z 10V
C173	24100104	Cap, Chip	0.1 μF	Z 25V
C174	24296473	Cap, Chip, Tantalum	0.047 μF	M 35V
C175	24011153	Res, Chip	15k	J 1/20W
C176	24092538	Cap, Chip	1 μF	Z 10V
C177	24088979	Cap, Chip, Tantalum	1 μF	M 25V
C178	24109103	Cap, Chip	0.01 μF	K 25V
C180	24088979	Cap, Chip, Tantalum	1 μF	M 25V
C182	24105101	Cap, Chip, Ceramic	100pF	J 50V
C183	24100104	Cap, Chip	0.1 μF	Z 25V
C184	24100104	Cap, Chip	0.1 μF	Z 25V
C185	24100104	Cap, Chip	0.1 μF	Z 25V
C195	24100104	Cap, Chip	0.1 μF	Z 25V
C196	24088080	Cap, Chip, Tantalum	33 μF	M 10V
C197	24105220	Cap, Chip, Ceramic	22pF	J 50V
C198	24105220	Cap, Chip, Ceramic	22pF	J 50V
C199	24105220	Cap, Chip, Ceramic	22pF	J 50V
C200	24100104	Cap, Chip	0.1 μF	Z 25V
C201	24088080	Cap, Chip, Tantalum	33 μF	M 10V
C202	24100104	Cap, Chip	0.1 μF	Z 25V
C204	24088966	Cap, Chip, Tantalum	10 μF	M 4V
C205	24088966	Cap, Chip, Tantalum	10 μF	M 4V
C206	24088966	Cap, Chip, Tantalum	10 μF	M 4V
C207	24088080	Cap, Chip, Tantalum	33 μF	M 10V
C208	24100104	Cap, Chip	0.1 μF	Z 25V
C209	24088905	Cap, Tantalum, Chip	6.8 μF	M 6.3V
C210	24100104	Cap, Chip	0.1 μF	Z 25V
C211	24100104	Cap, Chip	0.1 μF	Z 25V
C212	24088079	Cap, Chip, Tantalum	10 μF	M 10V
C213	24105010	Cap, Chip, Ceramic	1pF	C 50V
C214	24088951	Cap, Chip, Tantalum	6.8 μF	M 16V
C215	24092441	Cap, Chip, Ceramic	1 μF	Z 16V
C216	24619096	Chip, Chemicon	22 μF	M 6.3V
C217	24619098	Chip, Chemicon	100 μF	M 6.3V
C218	24100104	Cap, Chip	0.1 μF	Z 25V
C219	24100104	Cap, Chip	0.1 μF	Z 25V
C220	24088078	Cap, Chip, Tantalum	15 μF	M 6.3V
C226	24100104	Cap, Chip	0.1 μF	Z 25V
C227	24100104	Cap, Chip	0.1 μF	Z 25V
C228	24100104	Cap, Chip	0.1 μF	Z 25V
C229	24100104	Cap, Chip	0.1 μF	Z 25V
C230	24100104	Cap, Chip	0.1 μF	Z 25V
C231	24100104	Cap, Chip	0.1 μF	Z 25V
C232	24100104	Cap, Chip	0.1 μF	Z 25V
C233	24100104	Cap, Chip	0.1 μF	Z 25V
C234	24100104	Cap, Chip	0.1 μF	Z 25V
C235	24100104	Cap, Chip	0.1 μF	Z 25V
C236	24088080	Cap, Chip, Tantalum	33 μF	M 10V
C237	24100104	Cap, Chip	0.1 μF	Z 25V
C238	24100104	Cap, Chip	0.1 μF	Z 25V
C239	24088080	Cap, Chip, Tantalum	33 μF	M 10V
C240	24092441	Cap, Chip, Ceramic	1 μF	Z 16V
C241	24092441	Cap, Chip, Ceramic	1 μF	Z 16V
C242	24092441	Cap, Chip, Ceramic	1 μF	Z 16V
C243	24100104	Cap, Chip	0.1 μF	Z 25V
C244	24092441	Cap, Chip, Ceramic	1 μF	Z 16V
C245	24092441	Cap, Chip, Ceramic	1 μF	Z 16V
C246	24100104	Cap, Chip	0.1 μF	Z 25V
C247	24105220	Cap, Chip, Ceramic	22pF	J 50V
C248	24105200	Cap, Chip, Ceramic	20pF	J 50V
C249	24100104	Cap, Chip	0.1 μF	Z 25V
C250	24296334	Cap, Chip, Tantalum	0.33 μF	M 35V
C253	24100104	Cap, Chip	0.1 μF	Z 25V
C254	24100104	Cap, Chip	0.1 μF	Z 25V
C255	24100104	Cap, Chip	0.1 μF	Z 25V
C256	24088088	Cap, Chip, Tantalum	47 μF	M 20V
C257	24109103	Cap, Chip, Ceramic	0.01 μF	K 25V
C259	24100104	Cap, Chip	0.1 μF	Z 25V
C260	24100104	Cap, Chip	0.1 μF	Z 25V
C261	24092538	Cap, Chip	1 μF	Z 10V
C262	24100104	Cap, Chip	0.1 μF	Z 25V
C263	24100104	Cap, Chip	0.1 μF	Z 25V
C264	24088080	Cap, Chip, Tantalum	33 μF	M 10V
C265	24100104	Cap, Chip	0.1 μF	Z 25V
C266	24100104	Cap, Chip	0.1 μF	Z 25V
C267	24100104	Cap, Chip	0.1 μF	Z 25V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C268	24100104	Cap, Chip	0.1 μF	Z 25V
C269	24100104	Cap, Chip	0.1 μF	Z 25V
C270	24088080	Cap, Chip, Tantalum	33 μF	M 10V
		-RESISTORS-		
R101	24011331	Res, Chip	330	J 1/20W
R102	24011102	Res, Chip	1k	J 1/20W
R103	24011102	Res, Chip	1k	J 1/20W
R104	24011101	Res, Chip	100	J 1/20W
R105	24011122	Res, Chip	1.2k	J 1/20W
R106	24011303	Res, Chip	30k	J 1/20W
R107	24011203	Res, Chip	20k	J 1/20W
R109	24011271	Res, Chip	270	J 1/20W
R110	24011271	Res, Chip	270	J 1/20W
R112	24011104	Res, Chip	100k	J 1/20W
R113	24011103	Res, Chip	10k	J 1/20W
R114	24011393	Res, Chip	39k	J 1/20W
R115	24011203	Res, Chip	20k	J 1/20W
R116	24011103	Res, Chip	10k	J 1/20W
R118	24011101	Res, Chip	100	J 1/20W
R119	24011101	Res, Chip	100	J 1/20W
R120	24011153	Res, Chip	15k	J 1/20W
R121	24011223	Res, Chip	22k	J 1/20W
R122	24019018	Res, Chip	750	J 1/4W
R123	24011750	Res, Chip	75	J 1/20W
R124	24011472	Res, Chip	4.7k	J 1/20W
R127	24011103	Res, Chip	10k	J 1/20W
R128	24011823	Res, Chip	82k	J 1/20W
R129	24011333	Res, Chip	33k	J 1/20W
R130	24011393	Res, Chip	39k	J 1/20W
R131	24011622	Res, Chip	6.2k	J 1/20W
R132	24011472	Res, Chip	4.7k	J 1/20W
R133	24011100	Res, Chip	10	J 1/20W
R134	24011100	Res, Chip	10	J 1/20W
R135	24011100	Res, Chip	10	J 1/20W
R136	24011100	Res, Chip	10	J 1/20W
R137	24011100	Res, Chip	10	J 1/20W
R138	24011104	Res, Chip	100k	J 1/20W
R139	24011512	Res, Chip	5.1k	J 1/20W
R140	24011752	Res, Chip	7.5k	J 1/20W
R141	24000445	Res, Chip Jumper	0	
R142	24000445	Res, Chip Jumper	0	
R144	24011151	Res, Chip	150	J 1/20W
R145	24011151	Res, Chip	150	J 1/20W
R146	24000445	Res, Chip Jumper	0	
R148	24011151	Res, Chip	150	J 1/20W
R149	24011151	Res, Chip	150	J 1/20W
R151	24000445	Res, Chip Jumper	0	
R152	24000445	Res, Chip Jumper	0	
R154	24000445	Res, Chip Jumper	0	
R155	24011201	Res, Chip	200	J 1/20W
R156	24011471	Res, Chip	470	J 1/20W
R157	24011104	Res, Chip	100k	J 1/20W
R158	24011683	Res, Chip	68k	J 1/20W
R160	24011105	Res, Chip	1M	J 1/20W
R161	24011302	Res, Chip	3k	J 1/20W
R162	24011302	Res, Chip	3k	J 1/20W
R163	24011242	Res, Chip	2.4k	J 1/20W
R164	24011562	Res, Chip	5.6k	J 1/20W
R165	24000445	Res, Chip Jumper	0	
R166	24011472	Res, Chip	4.7k	J 1/20W
R167	24011102	Res, Chip	1k	J 1/20W
R168	24000445	Res, Chip Jumper	0	
R169	24011105	Res, Chip	1M	J 1/20W
R170	24011333	Res, Chip	33k	J 1/20W
R171	24011333	Res, Chip	33k	J 1/20W
R172	24011122	Res, Chip	1.2k	J 1/20W
R173	24011563	Res, Chip	56k	J 1/20W
R174	24011471	Res, Chip	470	J 1/20W
R175	24011102	Res, Chip	1k	J 1/20W
R176	24011222	Res, Chip	2.2k	J 1/20W
R177	24011562	Res, Chip	5.6k	J 1/20W
R178	24011103	Res, Chip	10k	J 1/20W
R179	24011222	Res, Chip	2.2k	J 1/20W
R180	24011224	Res, Chip	220k	J 1/20W
R181	24011103	Res, Chip	10k	J 1/20W
R182	24011101	Res, Chip	100	J 1/20W
R183	24011561	Res, Chip	560	J 1/20W
R184	24011101	Res, Chip	100	J 1/20W
R185	24011222	Res, Chip	2.2k	J 1/20W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R186	24011102	Res,Chip	1k	J 1/20W
R187	24011332	Res,Chip	3.3k	J 1/20W
R188	24011393	Res,Chip	39k	J 1/20W
R189	24011103	Res,Chip	10k	J 1/20W
R190	24011222	Res,Chip	2.2k	J 1/20W
R191	24011183	Res,Chip	18k	J 1/20W
R192	24011101	Res,Chip	100	J 1/20W
R194	24011183	Res,Chip	18k	J 1/20W
R195	24011103	Res,Chip	10k	J 1/20W
R196	24011104	Res,Chip	100k	J 1/20W
R197	24011123	Res,Chip	12k	J 1/20W
R198	24011682	Res,Chip	6.8k	J 1/20W
R199	24011183	Res,Chip	18k	J 1/20W
R200	24011623	Res,Chip	62k	J 1/20W
R201	24011822	Res,Chip	8.2k	J 1/20W
R202	24011752	Res,Chip	7.5k	J 1/20W
R203	24011102	Res,Chip	1k	J 1/20W
R204	24011473	Res,Chip	47k	J 1/20W
R205	24011682	Res,Chip	6.8k	J 1/20W
R206	24011472	Res,Chip	4.7k	J 1/20W
R207	24000445	Res,Chip Jumper	0	
R208	24011393	Res,Chip	39k	J 1/20W
R209	24011472	Res,Chip	4.7k	J 1/20W
R210	24011472	Res,Chip	4.7k	J 1/20W
R211	24011102	Res,Chip	1k	J 1/20W
R212	24011473	Res,Chip	47k	J 1/20W
R213	24011332	Res,Chip	3.3k	J 1/20W
R214	24011472	Res,Chip	4.7k	J 1/20W
R217	24000445	Res,Chip Jumper	0	
R219	24011105	Res,Chip	1M	J 1/20W
R220	24011105	Res,Chip	1M	J 1/20W
R221	24011332	Res,Chip	3.3k	J 1/20W
R222	24011332	Res,Chip	3.3k	J 1/20W
R223	24011222	Res,Chip	2.2k	J 1/20W
R225	24011222	Res,Chip	2.2k	J 1/20W
R226	24000445	Res,Chip Jumper	0	
R252	24011102	Res,Chip	1k	J 1/20W
R253	24000445	Res,Chip Jumper	0	
R254	24000445	Res,Chip Jumper	0	
R255	24011102	Res,Chip	1k	J 1/20W
R256	24011102	Res,Chip	1k	J 1/20W
R257	24011102	Res,Chip	1k	J 1/20W
R260	24011301	Res,Chip	300	J 1/20W
R261	24011561	Res,Chip	560	J 1/20W
R262	24011103	Res,Chip	10k	J 1/20W
R263	24011392	Res,Chip	3.9k	J 1/20W
R264	24011301	Res,Chip	300	J 1/20W
R265	24011561	Res,Chip	560	J 1/20W
R266	24011105	Res,Chip	1M	J 1/20W
R267	24011332	Res,Chip	3.3k	J 1/20W
R268	24011332	Res,Chip	3.3k	J 1/20W
R269	24011105	Res,Chip	1M	J 1/20W
R271	24000445	Res,Chip Jumper	0	
R272	24011752	Res,Chip	7.5k	J 1/20W
R273	24011752	Res,Chip	7.5k	J 1/20W
R274	24011102	Res,Chip	1k	J 1/20W
R275	24011102	Res,Chip	1k	J 1/20W
R276	24011472	Res,Chip	4.7k	J 1/20W
R277	24011182	Res,Chip	1.8k	J 1/20W
R278	24011472	Res,Chip	4.7k	J 1/20W
R279	24011242	Res,Chip	2.4k	J 1/20W
R280	24011822	Res,Chip	8.2k	J 1/20W
R281	24011562	Res,Chip	5.6k	J 1/20W
R282	24011122	Res,Chip	1.2k	J 1/20W
R283	24011102	Res,Chip	1k	J 1/20W
R284	24011392	Res,Chip	3.9k	J 1/20W
R285	24011222	Res,Chip	2.2k	J 1/20W
R286	24011152	Res,Chip	1.5k	J 1/20W
R287	24011433	Res,Chip	43k	J 1/20W
R288	24011152	Res,Chip	1.5k	J 1/20W
R289	24011432	Res,Chip	4.3k	J 1/20W
R290	24011271	Res,Chip	270	J 1/20W
R291	24011102	Res,Chip	1k	J 1/20W
R292	24011472	Res,Chip	4.7k	J 1/20W
R293	24011432	Res,Chip	4.3k	J 1/20W
R294	24011272	Res,Chip	2.7k	J 1/20W
R295	24011472	Res,Chip	4.7k	J 1/20W
R296	24011479	Res,Chip	4.7	J 1/20W
R297	24011479	Res,Chip	4.7	J 1/20W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R298	24011105	Res,Chip	1M	J 1/20W
R299	24998750	Res,Chip	75	D 1/16W
R300	24998750	Res,Chip	75	D 1/16W
R301	24998750	Res,Chip	75	D 1/16W
R320	24019404	Res,Chip	10k	J 1/16W
R321	24019404	Res,Chip	10k	J 1/16W
R322	24011103	Res,Chip	10k	J 1/20W
R323	24011101	Res,Chip	100	J 1/20W
R324	24011101	Res,Chip	100	J 1/20W
R325	24011102	Res,Chip	1k	J 1/20W
R326	24011101	Res,Chip	100	J 1/20W
R327	24011331	Res,Chip	330	J 1/20W
R328	24011331	Res,Chip	330	J 1/20W
R329	24011102	Res,Chip	1k	J 1/20W
R330	24011331	Res,Chip	330	J 1/20W
R331	24011331	Res,Chip	330	J 1/20W
R332	24011102	Res,Chip	1k	J 1/20W
R333	24011102	Res,Chip	1k	J 1/20W
R334	24011102	Res,Chip	1k	J 1/20W
R335	24011101	Res,Chip	100	J 1/20W
R336	24011223	Res,Chip	22k	J 1/20W
R337	24011223	Res,Chip	22k	J 1/20W
R338	24011333	Res,Chip	33k	J 1/20W
R339	24011333	Res,Chip	33k	J 1/20W
R340	24011101	Res,Chip	100	J 1/20W
R341	24019404	Res,Chip	10k	J 1/16W
R342	24019405	Res,Chip	15k	J 1/16W
R343	24011101	Res,Chip	100	J 1/20W
R344	24011103	Res,Chip	10k	J 1/20W
R345	24011101	Res,Chip	100	J 1/20W
R346	24011101	Res,Chip	100	J 1/20W
R347	24011101	Res,Chip	100	J 1/20W
R349	24011101	Res,Chip	100	J 1/20W
R350	24019403	Res,Chip	100k	J 1/16W
R351	24011474	Res,Chip	470k	J 1/20W
R352	24011472	Res,Chip	4.7k	J 1/20W
R355	24000445	Res,Chip Jumper	0	
R356	24011102	Res,Chip	1k	J 1/20W
R357	24011162	Res,Chip	1.6k	J 1/20W
R358	24011102	Res,Chip	1k	J 1/20W
R369	24000445	Res,Chip Jumper	0	
R370	24000445	Res,Chip Jumper	0	
R372	24011101	Res,Chip	100	J 1/20W
R373	24011473	Res,Chip	47k	J 1/20W
R375	24000445	Res,Chip Jumper	0	
R376	24000824	Res,Chip Jumper	0	
R377	24000445	Res,Chip Jumper	0	
R381	24000445	Res,Chip Jumper	0	
		-MISCELLANEOUS-		
H101	70137296	DC-DC Converter		
S101	70145478	Bit Switch	4Bit	
Z101	70132527	Oscillator	14.25MHz	
Z102	70132528	Oscillator	28.5MHz	
Z103	70132529	Oscillator	17.734475MHz	
Z104	70132530	B.P.F.	4.43MHz	
Z105	70132531	L.P.F.	6MHz	
Z109	70131229	Filter,Chip	HF50ACC3225T	
Z110	70131229	Filter,Chip	HF50ACC3225T	
Z111	23303089	Filter,Chip,EMI	FILTEM1031	
Z112	23303089	Filter,Chip,EMI	FILTEM1031	
Z113	23303089	Filter,Chip,EMI	FILTEM1031	
Z114	23303089	Filter,Chip,EMI	FILTEM1031	
Z115	70131229	Filter,Chip	HF50ACC3225T	
Z116	70131229	Filter,Chip	HF50ACC3225T	
Z117	70131229	Filter,Chip	HF50ACC3225T	
Z118	70131229	Filter,Chip	HF50ACC3225T	
Z119	70131231	Filter,Chip	HF70ACC5018T	
Z121	70131229	Filter,Chip	HF50ACC3225T	
Z122	23303089	Filter,Chip,EMI	FILTEM1031	
Z123	23303089	Filter,Chip,EMI	FILTEM1031	
■U701	70186923	P C Board Assy	FRONT(PB7625-1)	
		-DIODES-		
D701	A8690640	Diode,LED	TLUG163	
D702	70115496	Diode	RD6.2Z	
D703	70115496	Diode	RD6.2Z	
D704	70115496	Diode	RD6.2Z	
D705	70115496	Diode	RD6.2Z	
D706	70115496	Diode	RD6.2Z	

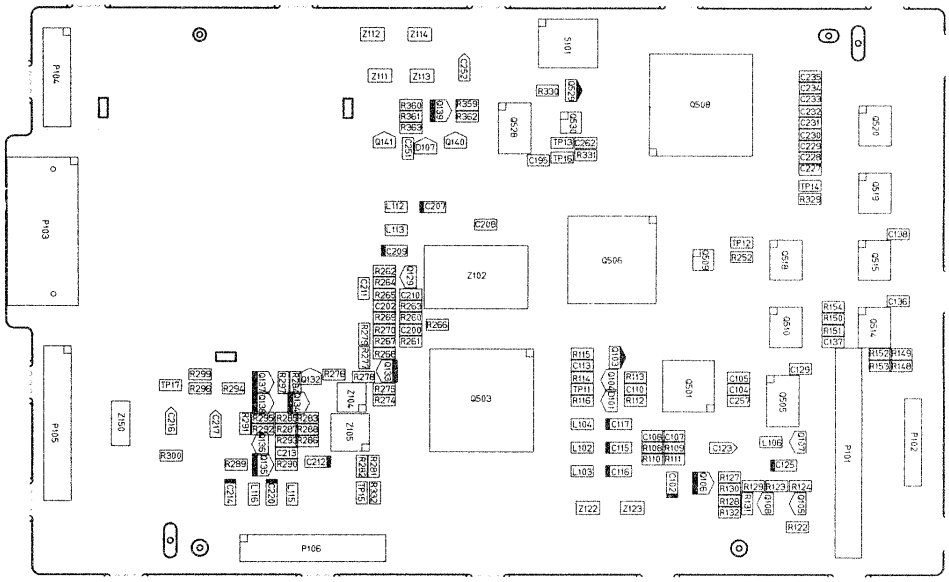
LOCATION NUMBER	PART NUMBER	DESCRIPTION		
D707	70115496	Diode	RD6.2Z	
D708	70115496	Diode	RD6.2Z	
D709	70115496	Diode	RD6.2Z	
D710	70115496	Diode	RD6.2Z	
		-CAPACITORS-		
C701	24088905	Cap,Tantalum,Chip	6.8 μF	M 6.3V
		-RESISTORS-		
R701	24011102	Res,Chip	1k	J 1/20W
RV71	70421338	Res,Variable	10k	0.3W
RV72	70421338	Res,Variable	10k	0.3W
		-MISCELLANEOUS-		
S701	23145533	Slide Switch	2C2P	
S702	23145532	Slide Switch	2C3P	
S703	23145532	Slide Switch	2C3P	
S704	23145295	Tact Switch	1C1P	
S705	23145295	Tact Switch	1C1P	
S706	23145295	Tact Switch	1C1P	
■U801	70186924	P C Board Assy	REAR(PB7625-2)	
		-DIODES-		
⚠D801	70115500	Diode	RD20FM	
⚠D802	23316382	Diode	SFPB-64V	
D803	23118263	Diode,Chip	RD30M	
D804	23118263	Diode,Chip	RD30M	
D805	23118263	Diode,Chip	RD30M	
D806	23118263	Diode,Chip	RD30M	
D807	23118263	Diode,Chip	RD30M	
D808	23118263	Diode,Chip	RD30M	
D809	23118263	Diode,Chip	RD30M	
D810	23118263	Diode,Chip	RD30M	
D811	70115496	Diode	RD6.2Z	
D812	70115496	Diode	RD6.2Z	
D813	70115496	Diode	RD6.2Z	
D814	70115496	Diode	RD6.2Z	
D815	70115496	Diode	RD6.2Z	
		-COILS-		
L801	23245853	Coil,Chip	1.5 μH	
		-RESISTORS-		
⚠R801	24000488	Res,Chip	3.9	J 1/2W
⚠R802	24000488	Res,Chip	3.9	J 1/2W
R803	24998750	Res,Chip	75	D 1/16W
		-MISCELLANEOUS-		
S801	23145478	Slide Switch	1C2P	
⚠Z801	70144823	Protecter	125V 1A	

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		-MECHANICAL PARTS-	
A201	70884411	Panel Assy,Front	
A202	70818070	CCU Case	
A202A	70391276	Screw	2x5mm
A202B	70860194	Foot Rubber	
A207A	70391732	Screw	2x4mm
A208A	70391732	Screw	2x4mm
A701	70990045	Carton Assy	
P901	70164697	Receptacle	HR25-7TRA-14SA
P901B	70891333	Spacer	
P901C	70177711	Wire, FPC	
P902	70165277	Receptacle,BNC	
P903	70165277	Receptacle,BNC	
P904	70165249	Receptacle,S-Video	TCS7848
P905	70165208	Receptacle,DC-in	HR10-7R-4PB
P907	70164760	Receptacle,D-Sub	D-Sub 9S
P907A	70391889	Screw	#4-40UNC-M3
U101A	70391849	Screw	2x5mm
U701A	70391849	Screw	2x5mm
U801A	70391849	Screw	2x5mm
Y102	70971731	Instruction Manual	
Y122	70103049	Ferrite EMI Core	SFC-6

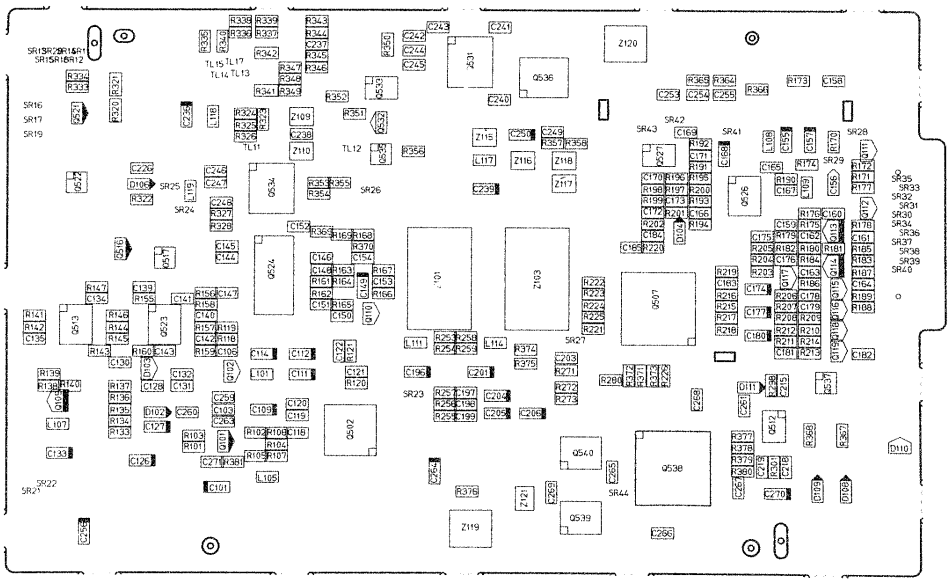
SECTION 4
PC BOARDS AND SCHEMATIC DIAGRAMS

1. PC BOARDS

1-1. Main PC Board

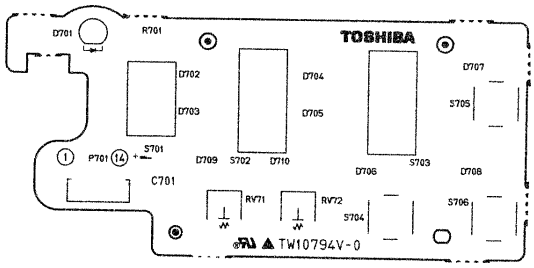


Component Side



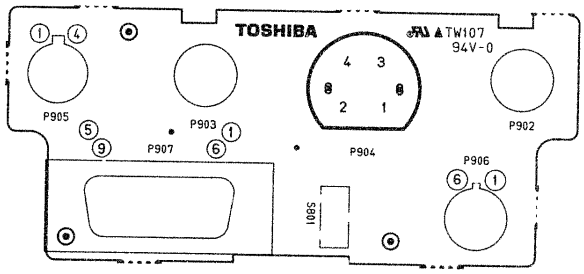
Soldering Side

1-2. Front PC Board

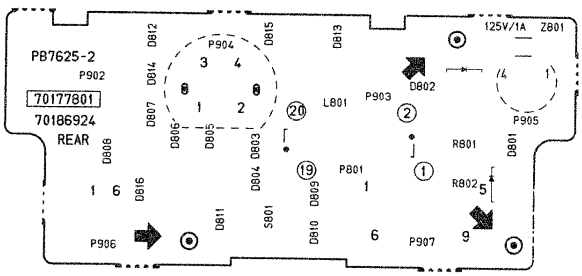


Component Side

1-3. Rear PC Board



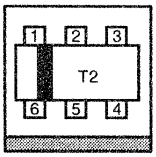
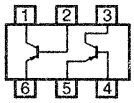
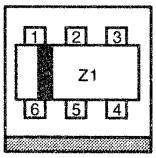
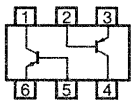
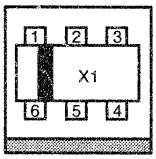
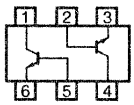
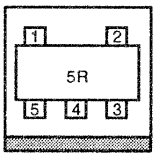
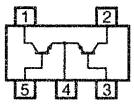
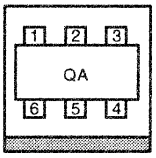
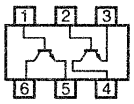
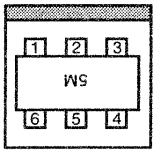
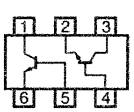
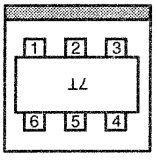
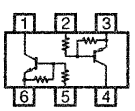
Component Side



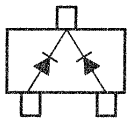
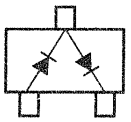
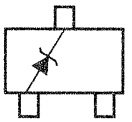
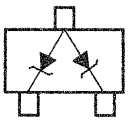
Soldering Side

2. PART CONFIGURATION

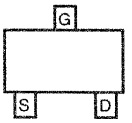
Transistor

Type name	Location Number	Shape/internal circuit
UMT2N	Q106	 
UMZ1N	Q109,Q134 Q137,Q138	 
UMX1N	Q113,Q133	 
XP1501	Q135	 
µPA673T	Q114	 
XN5531	Q101	 
XN4312	Q103	 

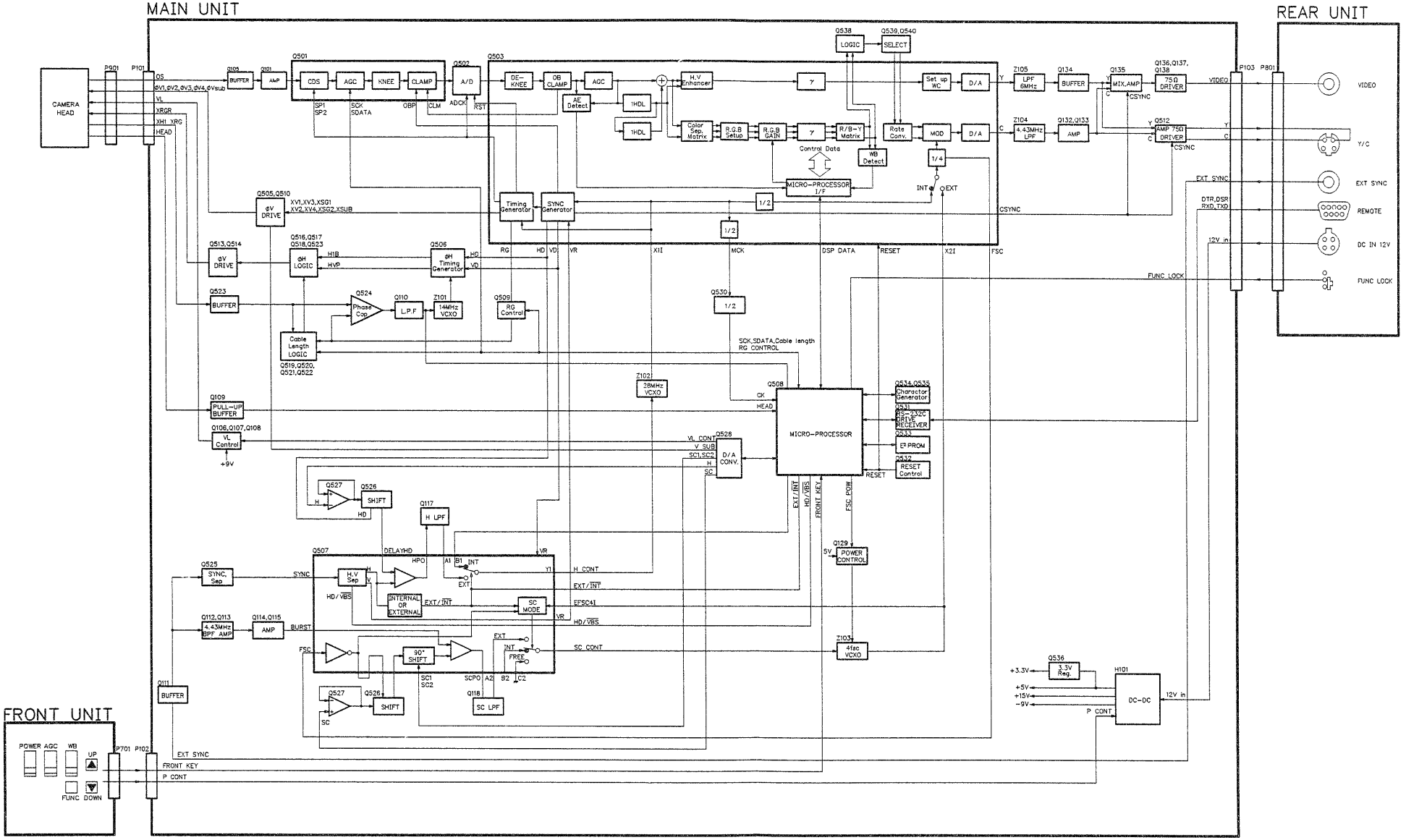
Dioder

Type name	Location Number	Shape/internal circuit
1SS301	D103	
1SS302	D101	
RD30MB	D803~D810	
RD6.2Z	D702~D710 D811~D816	

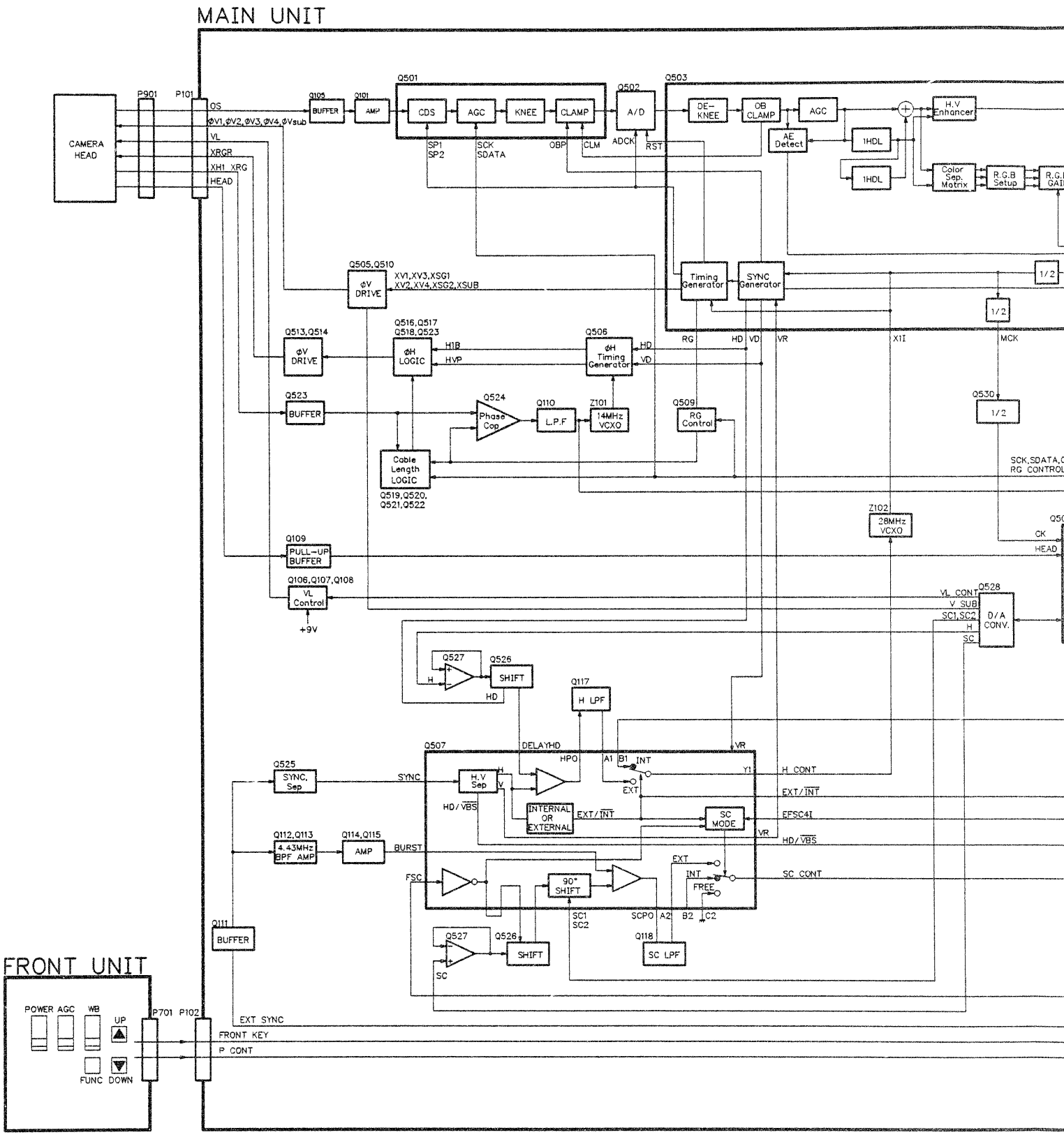
FET

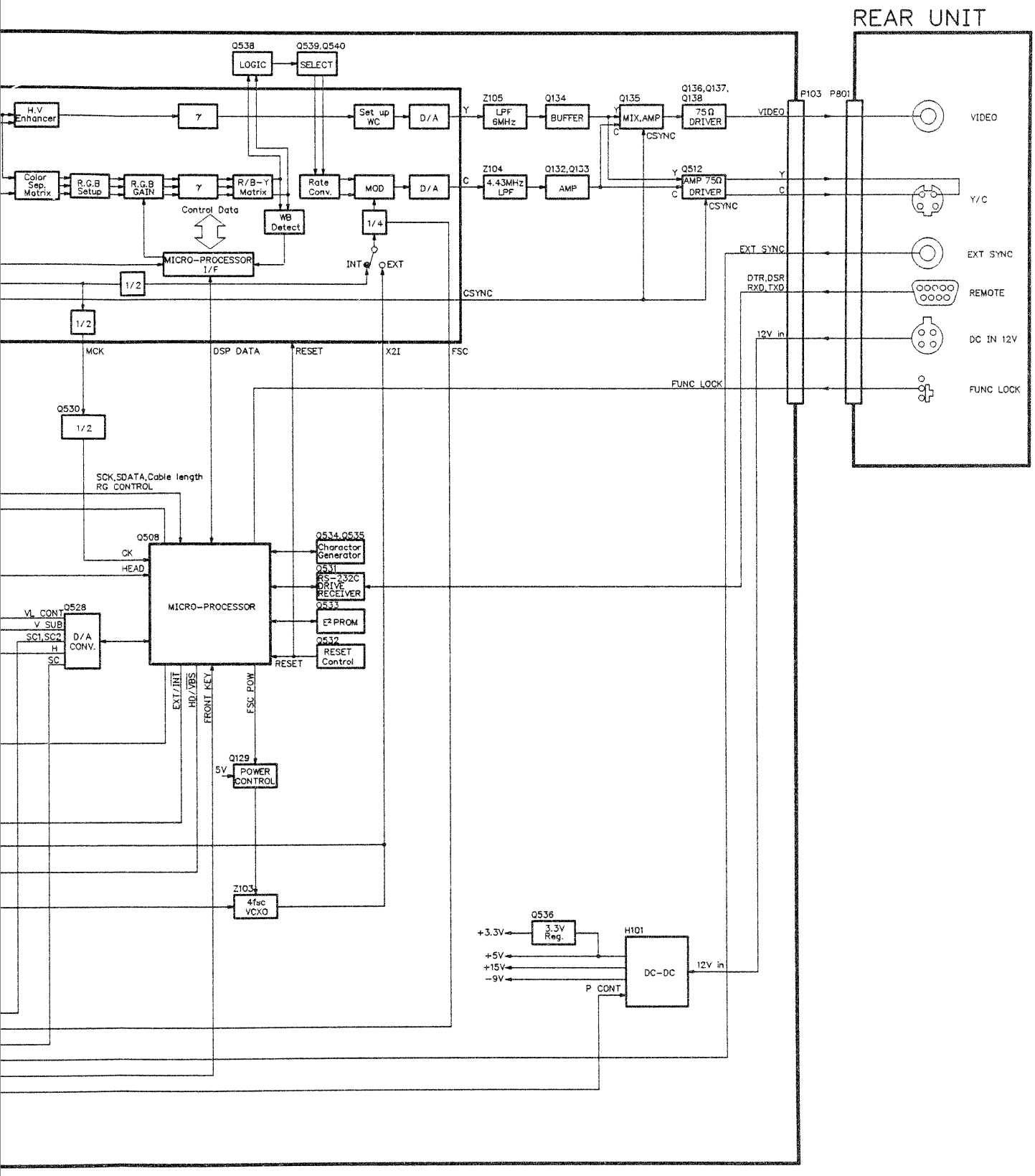
Type name	Location Number	Shape/internal circuit
2SK880	Q108,Q110 Q117,Q118 Q119	

3. BLOCK DIAGRAM



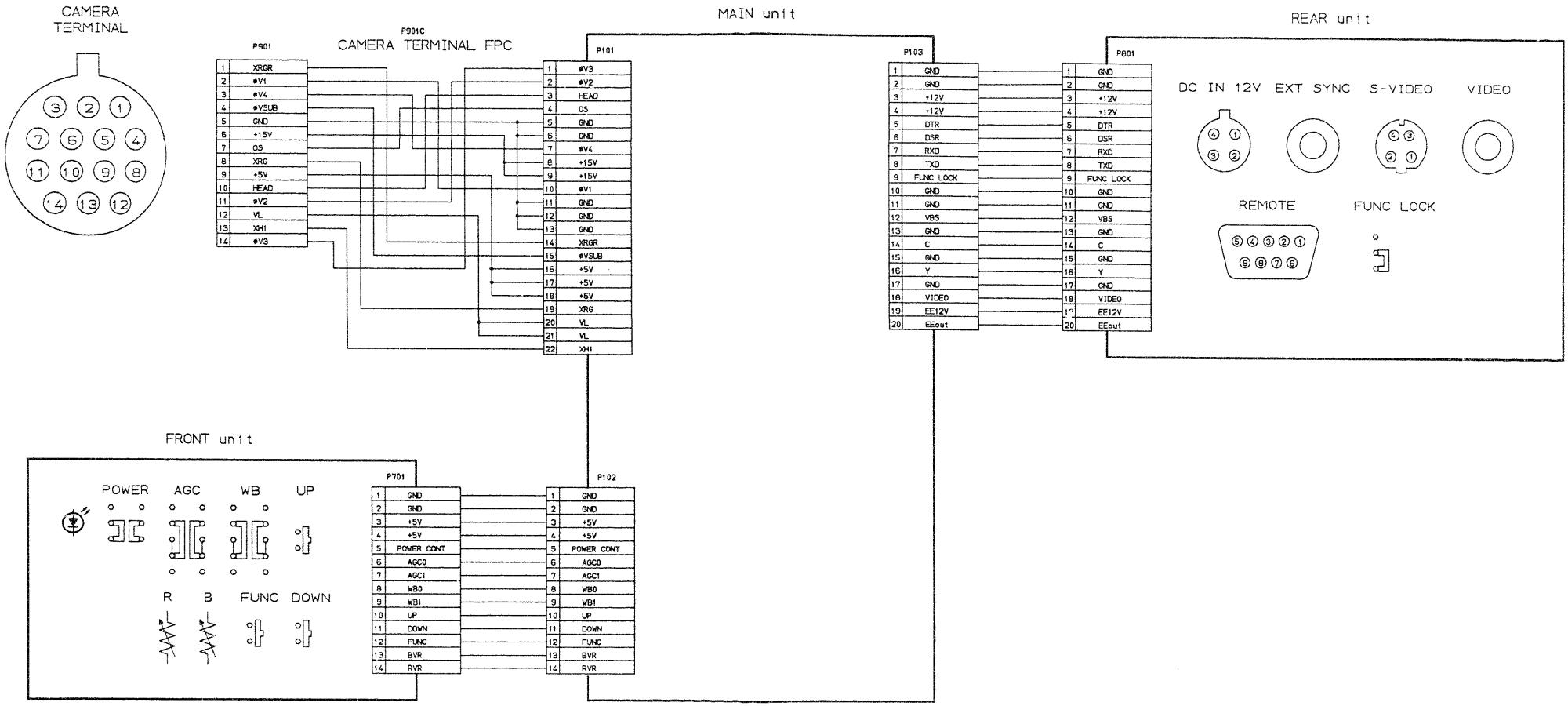
3. BLOCK DIAGRAM




REAR UNIT
Q538
LOGIC
Q539,Q540
SELECT
H.V Enhancer
γ
Set up WC
D/A
Y
Z105
LPF 6MHz
Q134
BUFFER
Q135
MIX.AMP
Q136,Q137, Q138
75Ω DRIVER
VIDEO
P103
P801
VIDEO
CSYNC
Color Sep. Matrix
R.G.B Setup
R.G.B GAIN
R/B-Y Matrix
Rate Conv.
MOD
C
Z104
4.43MHz LPF
Q132,Q133
AMP
Q512
AMP 75Ω DRIVER
Y/C
Control Data
WB Detect
1/4
MICRO-PROCESSOR I/F
INT
EXT
EXT SYNC
1/2
CSYNC
DTR,DSR
RXD,TXD
REMOTE
12V in
DC IN 12V
MCK
DSP DATA
RESET
X2I
FSC
FUNC LOCK
Q530
1/2
SCK,SDATA,Cable length
RG CONTROL
Q508
CK
HEAD
MICRO-PROCESSOR
Q534,Q535
Charactor Generator
Q531
RS-232C DRIVE RECEIVER
Q533
E²PROM
Q532
RESET Control
VL CONT
V SUB
SC1,SC2
H
SC
Q528
D/A CONV.
RESET
EXT/INT
HD/VBS
FRONT KEY
FSC POW
Q129
5V
POWER CONTROL
Z103
4fsc VCXO
Q536
+3.3V
3.3V Reg.
H101
+5V
+15V
-9V
P CONT
DC-DC
12V in

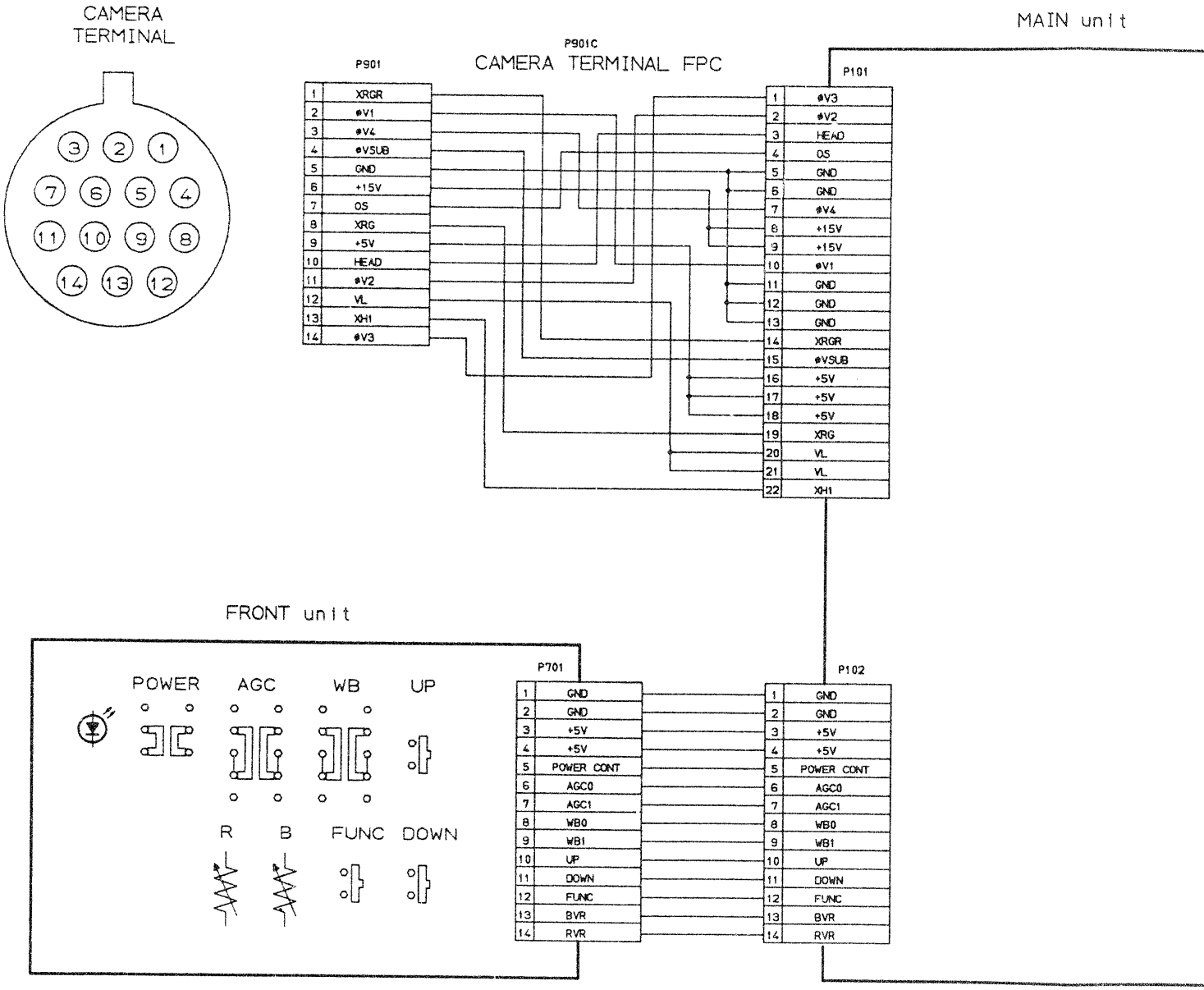
4. CIRCUIT DIAGRAMS

4-1. Overall Wiring Diagram



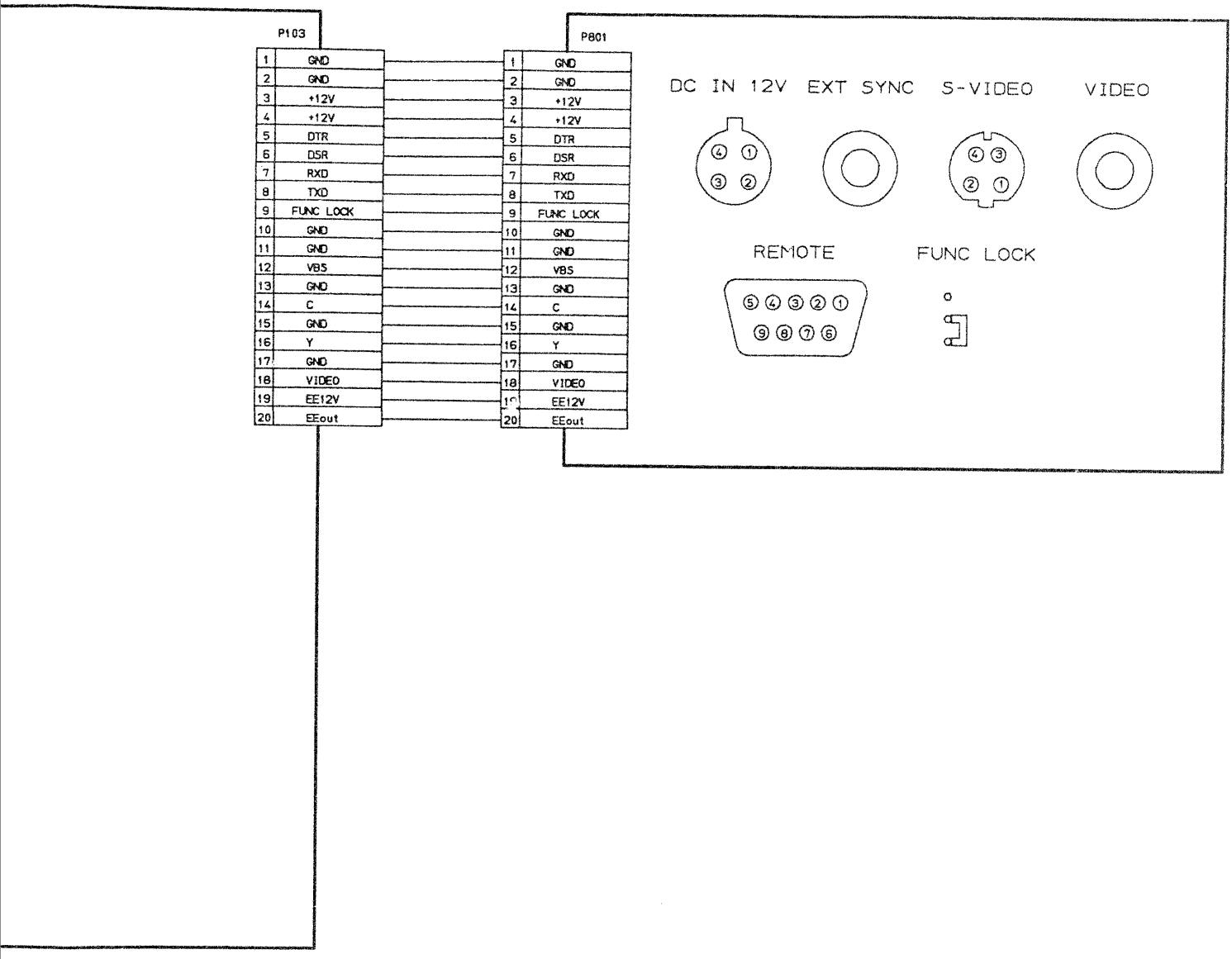
4. CIRCUIT DIAGRAMS

4-1. Overall Wiring Diagram

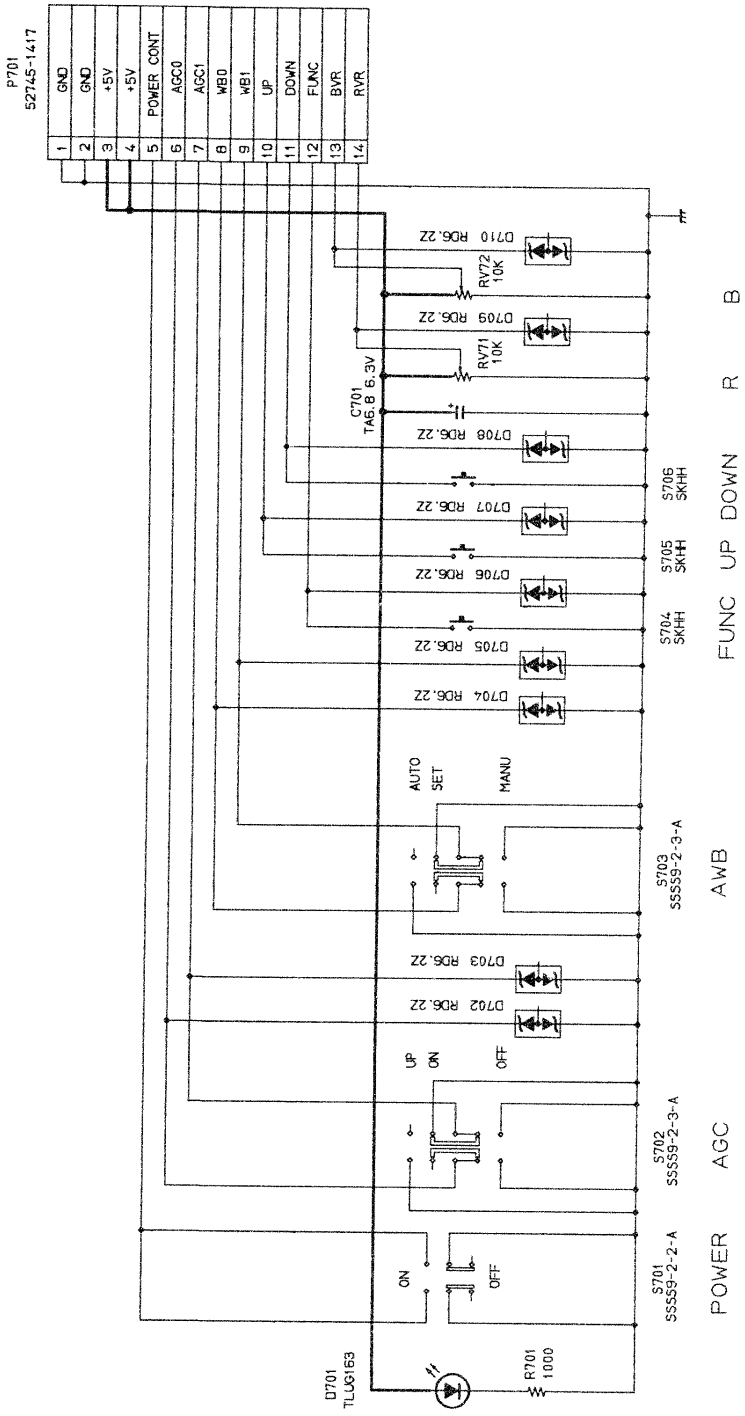


MAIN unit

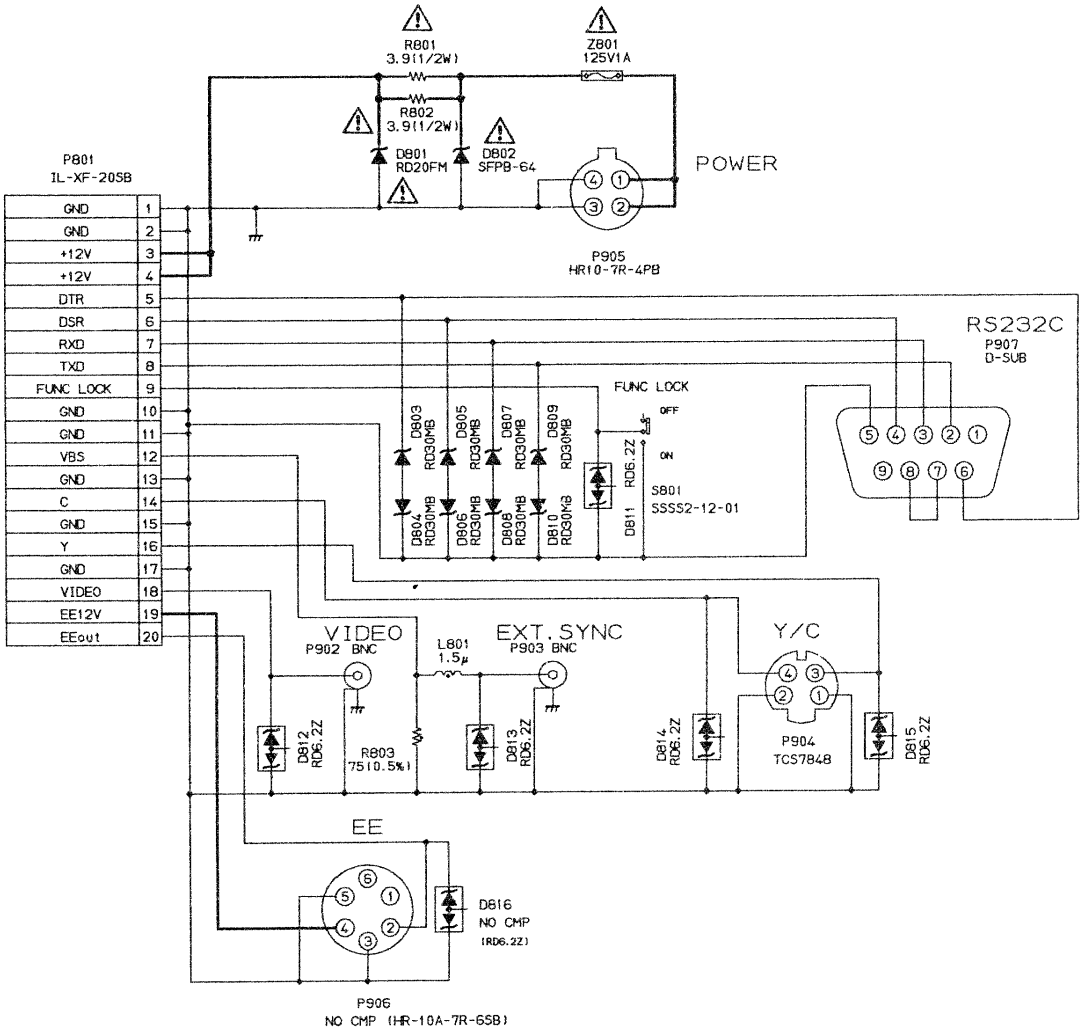
REAR unit



4-2. Front Circuit Diagram



4-3. Rear Circuit Diagram



4-4. Main Circuit Diagram

Each terminal voltage

D101 (V)

1	0.6
2	0
3	-4.5

P101 (V)

1	-7.5
2	-0.3
3	0
4	12.4
5	0
6	0
7	-7.6
8	15.7
9	15.7
10	-0.2
11	0
12	0
13	0
14	1.8
15	14.1
16	4.9
17	4.9
18	4.9
19	2.0
20	-8.0
21	-8.0
22	1.1

P103 (V)

1	0
2	0
3	11.7
4	11.7
5	-9.2
6	0
7	0
8	-9.2
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0.5
19	0
20	0

Z101 (V)

1	2.5
2	0
3	2.3
4	4.8

Z102 (V)

1	2.5
2	0
3	2.3
4	5.0

Z103 (V)

1	0.2
2	0
3	0
4	0.1

H101 (V)

1	-8.8
2	15.7
3	5.1
4	0
5	0
6	11.7

Q101 (V)

1	3.9
2	3.2
3	4.9
4	3.9
5	1.9
6	1.2

Q102 (V)

E	4.9
C	3.4
B	4.2

Q103 (V)

1	-4.5
2	-4.5
3	5.0
4	4.9
5	0
6	-4.5

Q104 (V)

E	-4.5
C	-8.8
B	-5.2

Q105 (V)

E	11.6
C	15.6
B	12.4

Q106 (V)

1	-8.6
2	0.5
3	-8.8
4	0
5	0.5
6	0.5

Q107 (V)

E	-8.0
C	-8.8
B	-8.6

Q108 (V)

D	4.8
G	5.0
S	4.8

Q109 (V)

1	4.9
2	0
3	0.6
4	-8.8
5	0.6
6	0

Q110 (V)

D	4.8
G	2.2
S	2.5

Q111 (V)

E	1.8
C	5.0
B	2.4

Q112 (V)

E	5.0
C	5.0
B	4.4

Q113 (V)

1	2.7
2	2.7
3	2.1
4	5.0
5	1.7
6	1.1

Q114 (V)

1	5.0
2	1.0
3	1.3
4	1.0
5	1.7
6	1.6

Q115 (V)

E	0.7
C	5.0
B	1.3

Q116 (V)

E	1.7
C	0
B	1.1

Q117 (V)

D	5.0
G	2.6
S	2.8

Q118 (V)

D	5.0
G	2.7
S	2.8

Q129 (V)

E	5.1
C	0.1
B	5.0

Q132 (V)

E	-0.6
C	5.0
B	0

Q133 (V)

1	5.0
2	0
3	-0.6
4	0.8
5	0.8
6	0.2

Q134 (V)

1	5.0
2	0.6
3	1.2
4	0
5	1.2
6	0.5

Q135 (V)

1	5.0
2	1.7
3	0.2
4	-0.4
5	0.2

Q136 (V)

E	1.0
C	5.0
B	1.7

Q137 (V)

1	5.0
2	1.0
3	1.7
4	-8.8
5	1.7
6	1.0

Q138 (V)

1	5.0
2	0.5
3	1.0
4	-8.8
5	1.0
6	0.5

Q501 (V)

1	–
2	–
3	0.8
4	0.9
5	–
6	3.4
7	3.4
8	1.4
9	0.9
10	4.2
11	–
12	–
13	–
14	–
15	4.9
16	2.4
17	–
18	3.4
19	0
20	0
21	3.4
22	–
23	–
24	–
25	–
26	–
27	3.4
28	0
29	-4.5
30	–
31	-3.3
32	-3.3
33	1.4
34	0.6
35	–
36	–
37	–
38	–
39	4.9
40	–
41	0
42	0
43	0
44	1.0
45	1.0
46	1.0
47	–
48	–

Q502 (V)

1	–
2	–
3	1.6
4	1.5
5	1.9
6	–
7	1.1
8	0.8
9	0.8
10	0.3
11	–
12	–
13	–
14	–
15	0.3
16	5.0
17	0
18	0
19	5.0
20	5.0
21	3.0
22	0
23	–
24	–
25	–
26	2.2
27	1.5
28	0.8
29	0
30	–
31	0.6
32	0
33	0
34	5.0
35	5.0
36	–
37	–
38	3.3
39	0
40	5.1
41	–
42	1.6
43	3.3
44	0
45	–
46	1.6
47	1.5
48	–

Q505 (V)

1	22.8
2	15.6
3	3.4
4	3.2
5	0.1
6	0.1
7	3.2
8	3.1
9	3.2
10	3.1
11	-7.6
12	-7.5
13	0
14	-0.2
15	-0.3
16	-8.0
17	-8.0
18	14.9
19	-6.7
20	1.2

Q506 (V)

1	0	41	0
2	–	42	–
3	–	43	–
4	–	44	–
5	–	45	–
6	–	46	–
7	–	47	–
8	–	48	–
9	3.0	49	–
10	3.0	50	–
11	3.2	51	–
12	2.3	52	4.0
13	2.4	53	–
14	–	54	0.2
15	0	55	–
16	4.9	56	–
17	4.9	57	0.1
18	0	58	–
19	0	59	–
20	0	60	0
21	0	61	–
22	0	62	–
23	4.9	63	–
24	0	64	–
25	–	65	–
26	–	66	4.9
27	–	67	4.9
28	–	68	–
29	–	69	4.9
30	0	70	4.9
31	4.9	71	0
32	–	72	–
33	–	73	0
34	–	74	–
35	–	75	–
36	–	76	–
37	–	77	2.3
38	–	78	–
39	–	79	0.5
40	4.9	80	4.9

Q507 (V)

1	0	33	0
2	0	34	0
3	5.0	35	0
4	0	36	0
5	0	37	0
6	2.8	38	0
7	0	39	0.7
8	2.8	40	5.0
9	0	41	0
10	2.8	42	0
11	5.0	43	0
12	0	44	5.0
13	4.0	45	0
14	4.6	46	0
15	2.3	47	0
16	2.5	48	0
17	2.5	49	0
18	2.5	50	5.0
19	2.5	51	0
20	0.6	52	0
21	0	53	5.0
22	0	54	0
23	2.7	55	–
24	0	56	5.0
25	2.8	57	–
26	–	58	3.1
27	0	59	2.9
28	2.8	60	–
29	2.4	61	–
30	2.5	62	0
31	2.4	63	–
32	5.0	64	5.1

Q508 (V)

1	–	41	3.1
2	–	42	3.2
3	1.7	43	0
4	3.2	44	2.9
5	–	45	0
6	–	46	0
7	–	47	3.2
8	–	48	0
9	3.2	49	0
10	0.5	50	0
11	0	51	0
12	0	52	0
13	0	53	0
14	1.6	54	0
15	–	55	0
16	–	56	0
17	–	57	3.2
18	–	58	3.2
19	1.8	59	0
20	2.4	60	3.2
21	0	61	3.2
22	3.2	62	3.2
23	0	63	3.2
24	0	64	0
25	3.2	65	3.2
26	3.2	66	3.2
27	3.2	67	0
28	1.6	68	0
29	5.1	69	3.2
30	1.1	70	0
31	1.3	71	3.2
32	0	72	0
33	2.4	73	0
34	0	74	0
35	3.2/0	75	0
36	5.1	76	3.2
37	2.5	77	3.2
38	0	78	3.2
39	0	79	3.2
40	0	80	0

Q509 (V)

1	0
2	1.2
3	1.2
4	0
5	1.5
6	3.0
7	0
8	3.2

Q510 (V)

1	3.2
2	0
3	3.2
4	3.2
5	0
6	3.2
7	0
8	3.1
9	3.1
10	0
11	3.0
12	2.9
13	0
14	3.2

Q512 (V)

1	2.4
2	0
3	2.6
4	2.6
5	2.8
6	–
7	5.0
8	2.8

Q513 (V)

1	0
2	4.9
3	0
4	–
5	4.9
6	0
7	0
8	2.1
9	2.6
10	2.6
11	2.6
12	0
13	4.9
14	4.9

Q514 (V)

1	0
2	4.9
3	0.8
4	4.0
5	4.0
6	0.8
7	0
8	3.8
9	0.8
10	3.8
11	0.8
12	–
13	4.9
14	4.9

Q515 (V)

1	4.9
2	4.0
3	0.8
4	0
5	0
6	4.8
7	0
8	4.0
9	0.8
10	4.8
11	4.8
12	0
13	0
14	4.9

Q516 (V)

1	2.5
2	0.3
3	0
4	2.6
5	4.9

Q517 (V)

1	2.5
2	2.4
3	0.3
4	0
5	0.5
6	4.7
7	0.8
8	4.9

Q518 (V)

1	4.9
2	4.7
3	0.2
4	3.1
5	4.7
6	0.2
7	4.7
8	0
9	2.9
10	4.7
11	0.2
12	4.7
13	4.9
14	0
15	4.9
16	4.9

Q519 (V)

1	4.7
2	0
3	0
4	0
5	0
6	0
7	0.5
8	0
9	4.8
10	0.5
11	0
12	0
13	0
14	0
15	0
16	4.8

Q520 (V)

1	4.5
2	0
3	4.8
4	0
5	0
6	4.8
7	0
8	0
9	0.1
10	0
11	4.8
12	0
13	0
14	4.8
15	0
16	4.8

Q521 (V)

1	0
2	4.7
3	0
4	0
5	4.8

Q522 (V)

1	4.8
2	3.9
3	4.7
4	0
5	1.0
6	0.5
7	0.9
8	4.8

Q523 (V)

1	3.0
2	0.5
3	2.3
4	2.5
5	2.5
6	2.4
7	0
8	3.8
9	1.0
10	1.0
11	2.4
12	4.7
13	0.1
14	4.8

Q524 (V)

1	4.0
2	2.1
3	3.8
4	4.9
5	4.9
6	0
7	0
8	0
9	4.9
10	–
11	0
12	0
13	2.2
14	1.5
15	2.5
16	4.9

Q525 (V)

1	3.0
2	4.5
3	0
4	5.0
5	5.0

Q526 (V)

1	2.5
2	5.0
3	5.0
4	2.5
5	4.0
6	0
7	3.0
8	0
9	3.0
10	5.0
11	5.0
12	1.0
13	2.6
14	0
15	3.5
16	5.0

Q527 (V)

1	3.5
2	1.0
3	1.0
4	0
5	3.4
6	3.4
7	4.2
8	15.7

Q528 (V)

1	0
2	2.5
3	0
4	0
5	3.4
6	5.0
7	–
8	–
9	–
10	5.1
11	5.1
12	–
13	–
14	–
15	3.3
16	3.3
17	3.3
18	–
19	2.6
20	0

Q529 (V)

1	1.5
2	–
3	0
4	1.8
5	3.2

Q530 (V)

1	1.6
2	1.6
3	1.6
4	0
5	1.7
6	3.2
7	3.2
8	3.2

Q531 (V)

1	9.3
2	3.2
3	3.3
4	0.1
5	1.7
6	–1.6
7	3.3
8	3.3
9	3.3
10	3.3
11	0
12	0
13	–9.2
14	–9.2
15	3.3
16	3.3
17	–9.2
18	0.1
19	0
20	3.2

Q532 (V)

1	–
2	3.3
3	0
4	–
5	3.0

Q533 (V)

1	0
2	0
3	0
4	3.3
5	0
6	–
7	2.8
8	3.3

Q534 (V)

1	3.3
2	3.3
3	0
4	3.1
5	3.3
6	0
7	1.3
8	1.3
9	0
10	0
11	–
12	–
13	–
14	0
15	0
16	–
17	0
18	0
19	3.1
20	2.9

Q535 (V)

1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	3.3

Q536 (V)

1	5.1
2	5.1
3	3.2
4	1.3
5	0

Q538 (V)

1	1.5
2	1.4
3	1.6
4	0
5	1.6
6	1.6
7	1.8
8	1.8
9	4.9
10	1.7
11	2.3
12	1.3
13	2.1
14	2.1
15	2.1
16	0
17	4.9
18	2.1
19	2.0
20	2.1
21	1.8
22	2.1
23	1.8
24	0
25	2.0
26	2.1
27	–
28	3.2
29	4.9
30	–
31	2.5
32	2.6
33	2.6
34	2.2
35	2.7
36	0
37	1.7
38	–
39	4.9
40	–
41	4.9
42	1.4
43	1.4
44	1.5

Q539 (V)

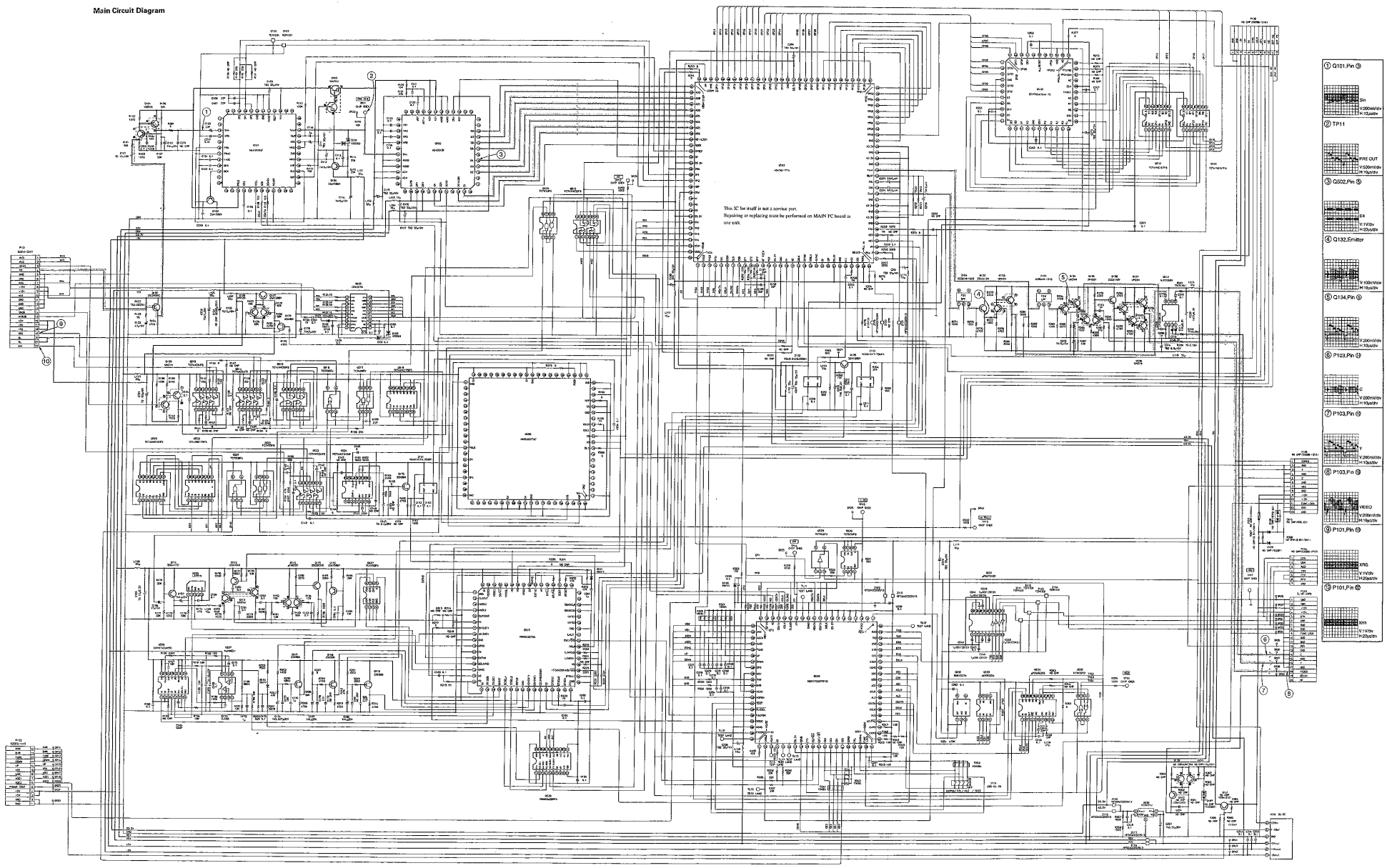
1	2.3
2	2.1
3	2.0
4	1.6
5	2.1
6	2.0
7	1.6
8	0
9	1.6
10	2.1
11	2.0
12	1.2
13	1.8
14	1.3
15	0
16	3.2

Q540 (V)

1	2.3
2	2.2
3	2.0
4	1.6
5	1.7
6	1.7
7	1.4
8	0
9	1.5
10	2.0
11	1.8
12	1.5
13	2.1
14	1.8
15	0
16	3.2

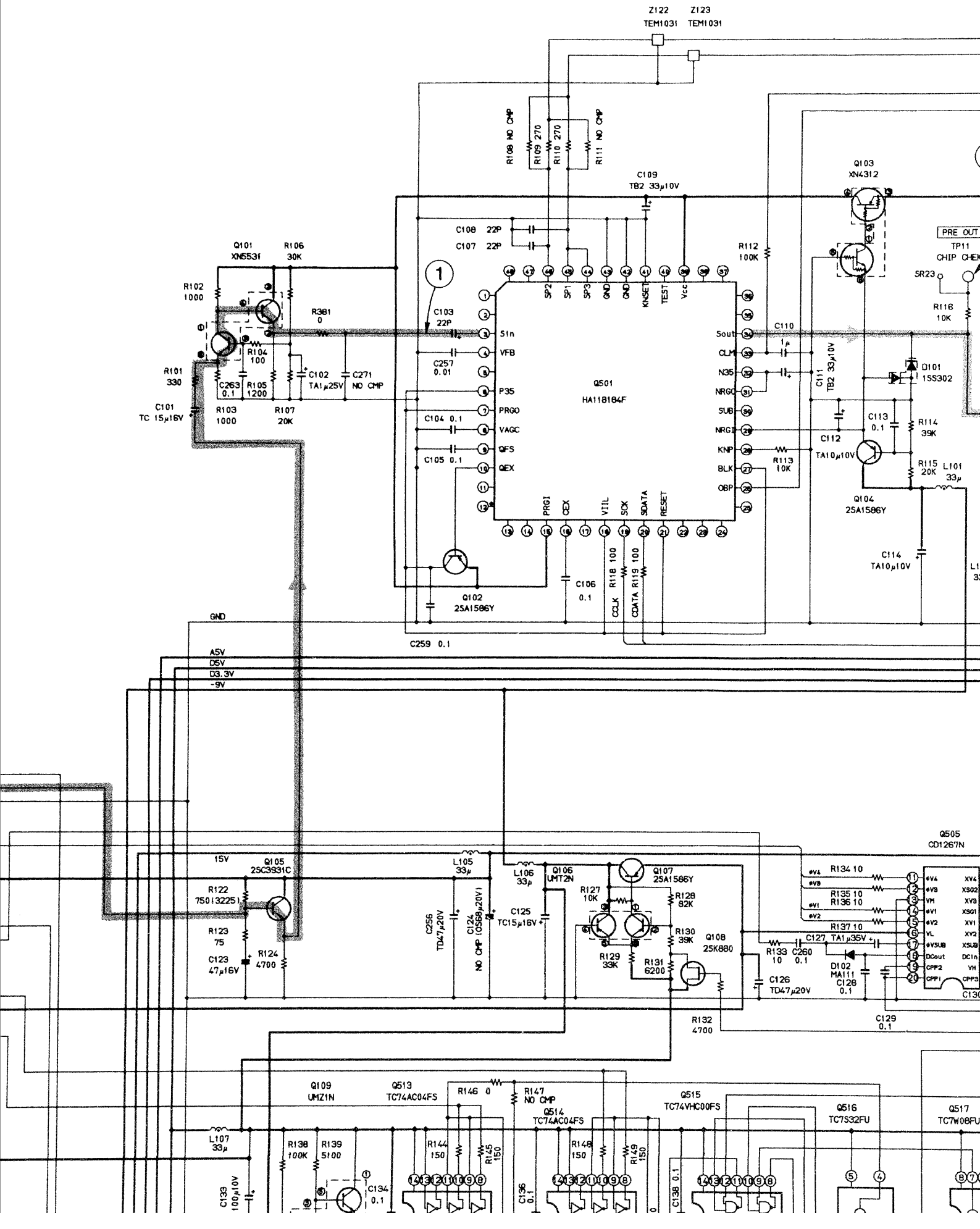
210-9713

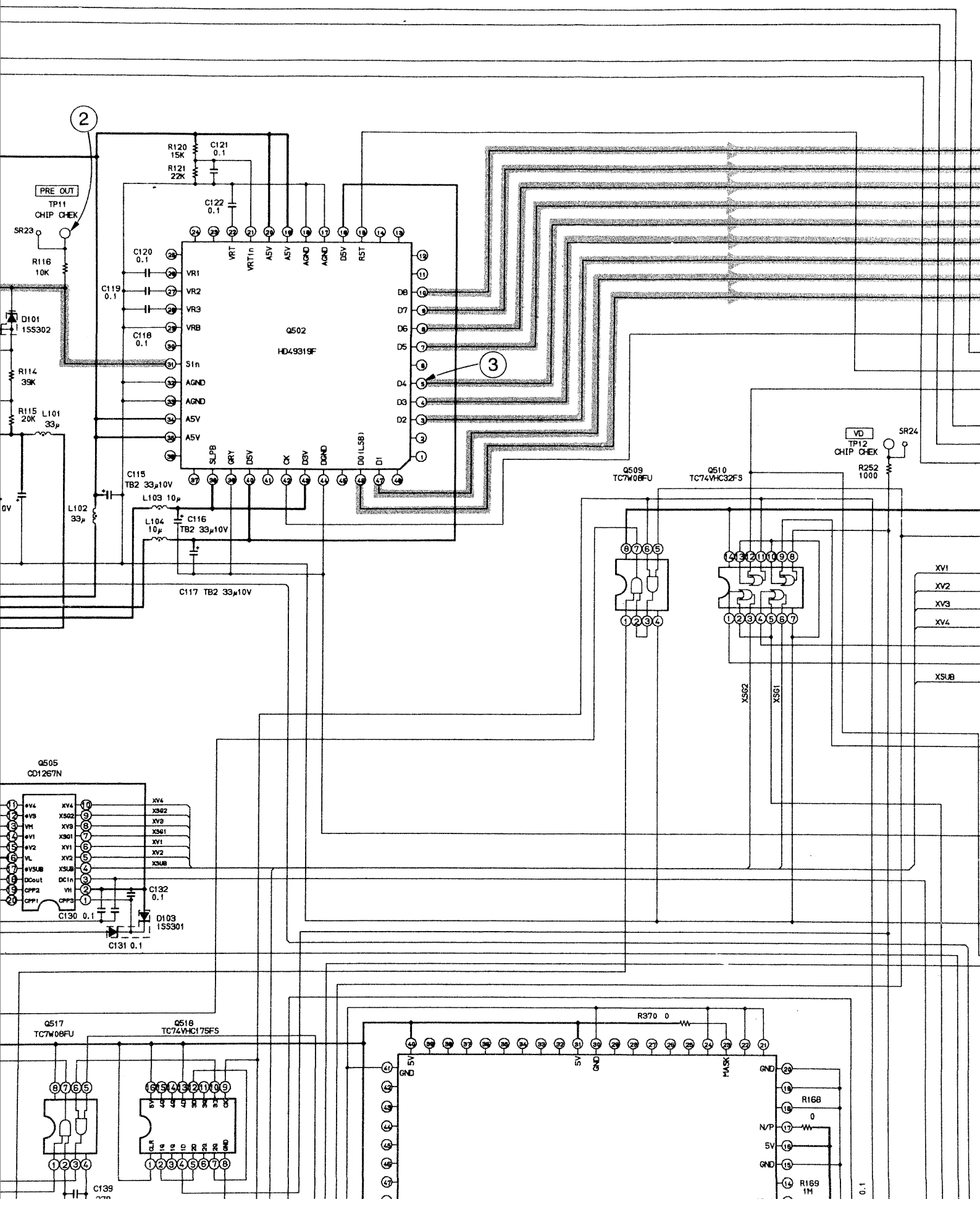
Main Circuit Diagram

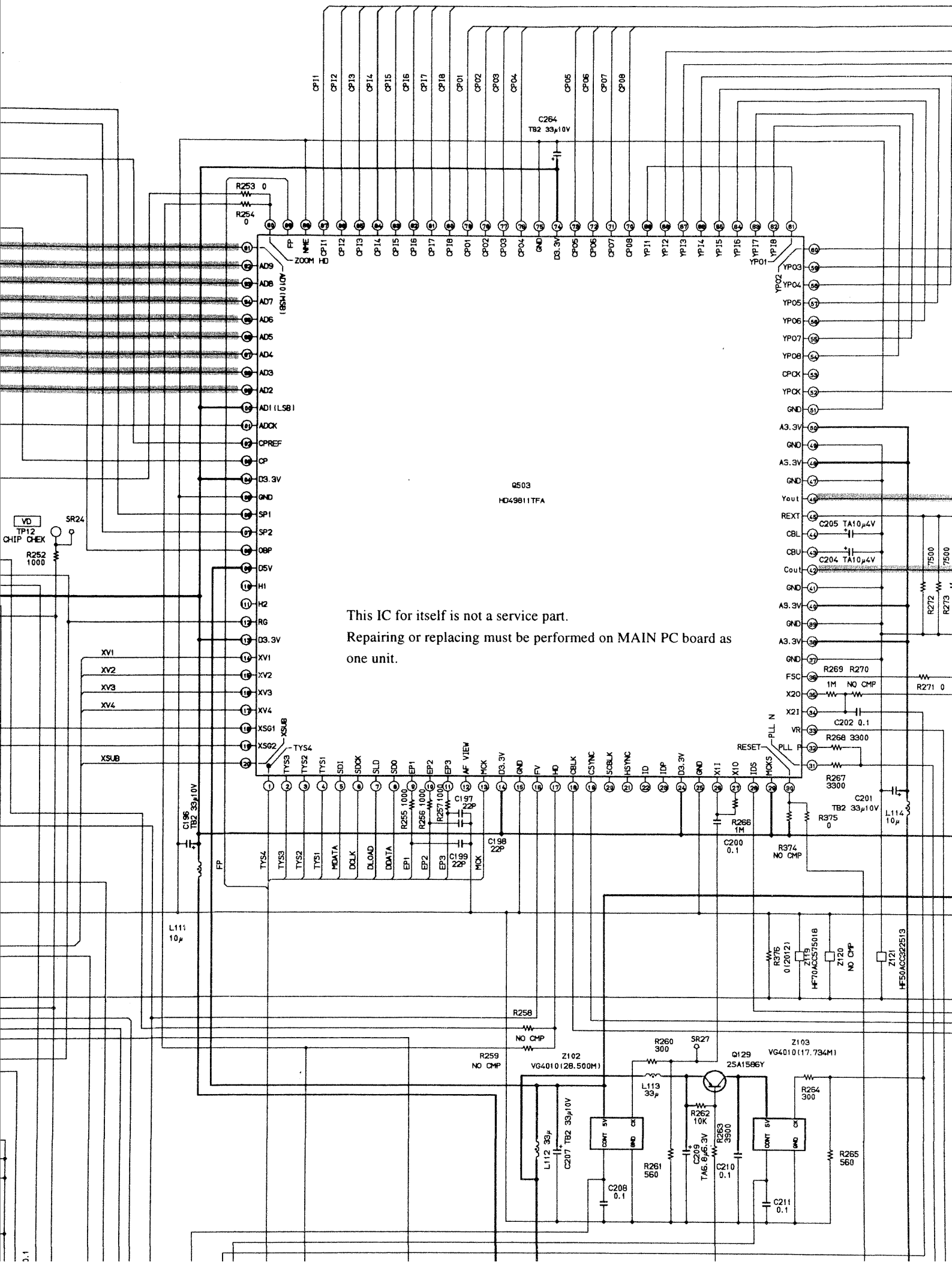


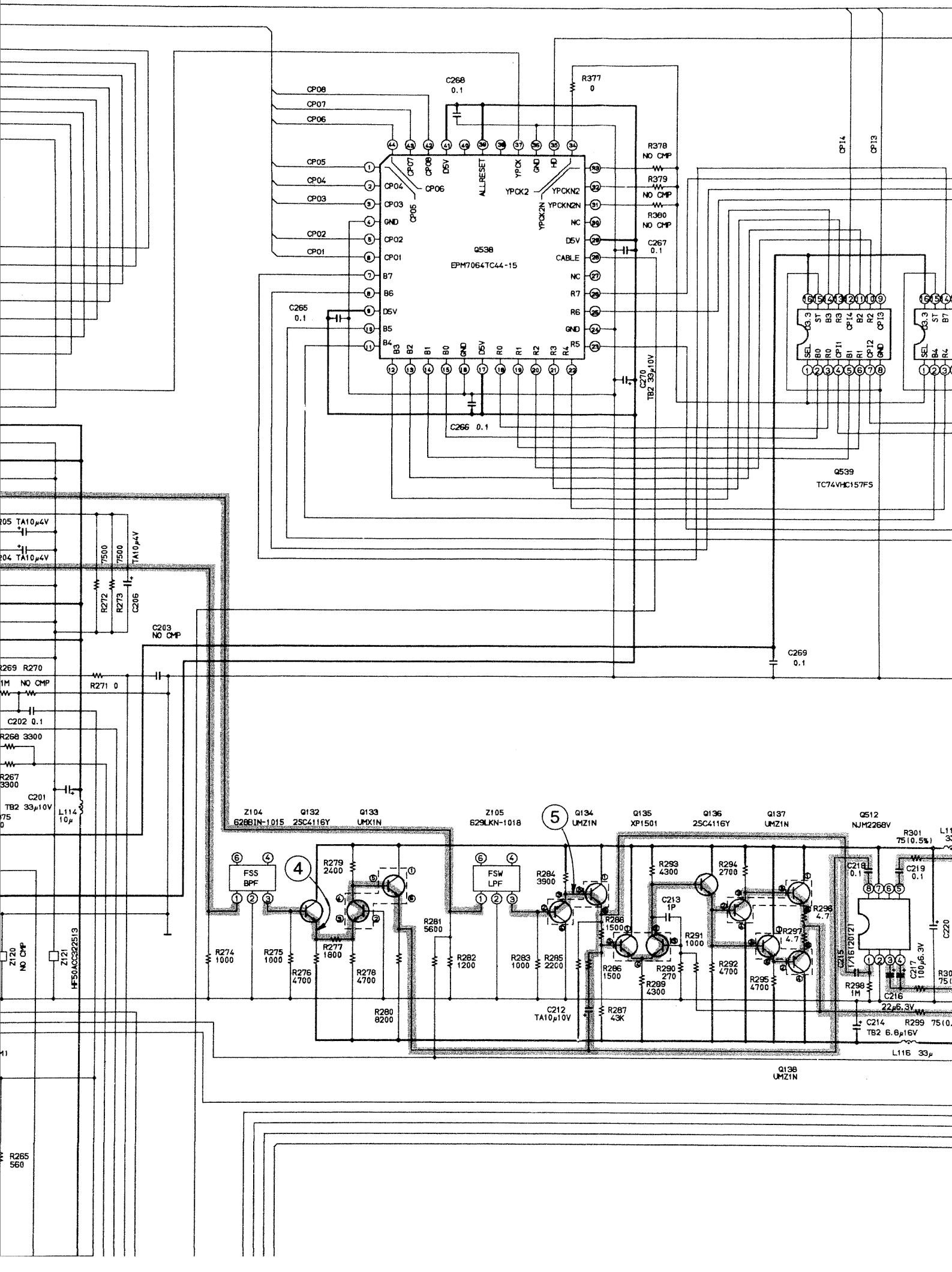
210-9713

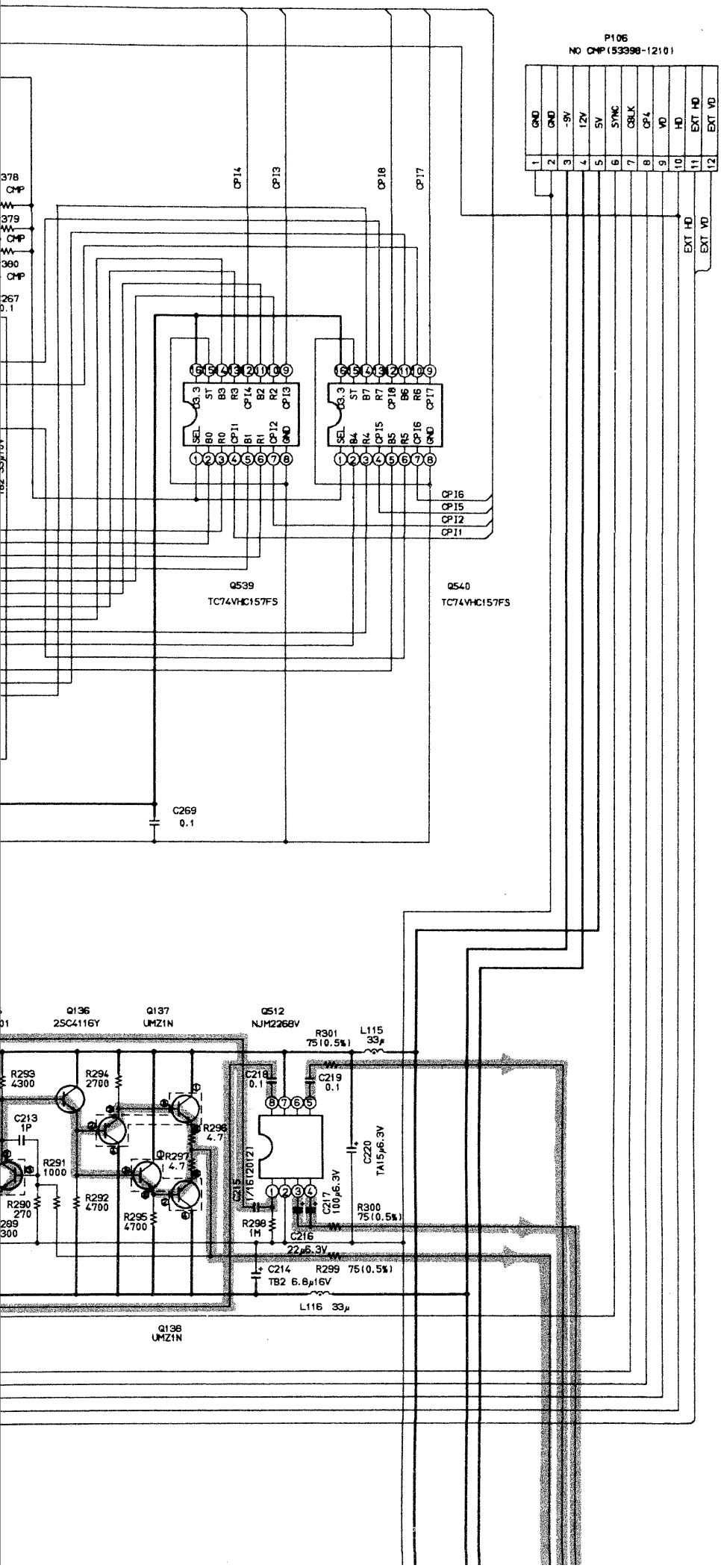
Main Circuit Diagram



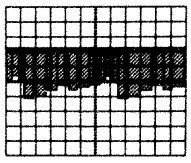

2
3
PRE OUT
TP11
CHIP CHEK
SR23
R116
10K
D101
1SS302
R114
39K
R115
20K
L101
33μ
L102
33μ
R120
15K
R121
22K
C121
0.1
C122
0.1
C120
0.1
C119
0.1
C118
0.1
Q502
HD49319F
VR1
VR2
VR3
VRB
S1n
AGND
AGND
A5V
A5V
VRT
VRT1n
A5V
A5V
AGND
AGND
D5V
RST
D8
D7
D6
D5
D4
D3
D2
D1
D0(LSB)
SLPB
GRY
DSV
CK
DSV
DGND
C115
TB2 33μ10V
L103 10μ
L104
10μ
C116
TB2 33μ10V
C117 TB2 33μ10V
VD
TP12
CHIP CHEK
SR24
R252
1000
Q509
TC7W08FU
Q510
TC74VHC32FS
XV1
XV2
XV3
XV4
XSUB
XSG2
XSG1
Q505
CD1267N
C132
0.1
C130 0.1
D103
1SS301
C131 0.1
Q517
TC7W08FU
Q518
TC74VHC175FS
C139
R370 0
5V
GND
5V
GND
MASK
R168
0
N/P
5V
GND
R169
1M
0.1


Q503
HD49811TFA
This IC for itself is not a service part.
Repairing or replacing must be performed on MAIN PC board as one unit.
C264 TB2 33μ10V
R253 0
R254 0
C205 TA10μ4V
C204 TA10μ4V
R269 R270
1M NO CMP
R271 0
C202 0.1
R268 3300
R267 3300
C201 TB2 33μ10V
L114 10μ
R375 0
R374 NO CMP
C200 0.1
R266 1M
C196 TB2 33μ10V
L111 10μ
C197 22P
C198 22P
C199 22P
R255 1000
R256 1000
R257 1000
R258 NO CMP
R259 NO CMP
Z102 VG4010(28.500M)
Z103 VG4010(17.734M)
Q129 2SA1586Y
R260 300
SR27
L113 33μ
R262 10K
R263 3900
R264 300
R265 560
R261 560
C207 TB2 33μ10V
L112 33μ
C208 0.1
C209 TA6.8μ6.3V
C210 0.1
C211 0.1
R376 0(2012)
Z119 HF70ACC575018
Z120 NO CHP
Z121 HF50ACC322513
R272 7500
R273 7500
TP12 CHIP CHEK
SR24
R252 1000
XV1
XV2
XV3
XV4
XSG1
XSG2
XSUB
TYS4
TYS3
TYS2
TYS1
MDATA
DCLK
DLOAD
DDATA
EP1
EP2
EP3
MCK
FP
ZOOM HD
NME
(BSW)10.0V
AD9
AD8
AD7
AD6
AD5
AD4
AD3
AD2
AD1(LSB)
ADCK
CPREF
CP
D3.3V
GND
SP1
SP2
08P
05V
H1
H2
RG
CP11
CP12
CP13
CP14
CP15
CP16
CP17
CP18
CP01
CP02
CP03
CP04
CP05
CP06
CP07
CP08
YP11
YP12
YP13
YP14
YP15
YP16
YP17
YP18
YP01
YP02
YP03
YP04
YP05
YP06
YP07
YP08
CPCK
YPCK
A3.3V
Yout
REXT
CBL
CBU
Cout
FSC
X20
X21
VR
PLL N
PLL P
RESET
X11
X10
IDS
MCKS
SCBLK
HSYNC
IDP
ID
CSYNC
CBLK
FV
HD
AF VIEW


Q538
EPM7064TC44-15
Q539
TC74VHC157FS
Z104
628BIN-1015
Q132
2SC4116Y
Q133
UMX1N
Z105
629LKN-1018
Q134
UMZ1N
Q135
XP1501
Q136
2SC4116Y
Q137
UMZ1N
Q512
NJM2268V
Q138
UMZ1N
FSS
BPF
FSW
LPF
C268
0.1
R377
0
R378
NO CMP
R379
NO CMP
R380
NO CMP
C267
0.1
C270
TB2 33μ10V
C265
0.1
C266 0.1
C269
0.1
C203
NO CMP
R271 0
C202 0.1
C201
TB2 33μ10V
L114
10μ
R272
7500
R273
7500
C206
TA10μ4V
R279
2400
R277
1800
R274
1000
R275
1000
R276
4700
R278
4700
R280
8200
R281
5600
R282
1200
R283
1000
R284
3900
R285
2200
C212
TA10μ10V
R287
43K
R288
1500Ω
R286
1500
R290
270
R289
4300
R291
1000
R293
4300
C213
1P
R294
2700
R292
4700
R295
4700
R297
4.7
R296
4.7
R298
1M
C216
22μ6.3V
C214
TB2 6.8μ16V
C215
C217
100μ6.3V
C218
0.1
C219
0.1
C220
R301
75Ω(0.5%)
L116 33μ
R265
560
R269 R270
1M NO CMP
R268 3300
R267
3300
Z120
NO CMP
Z121
HF50ACC322513
CP14
CP13

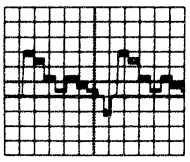


① Q101,Pin ③



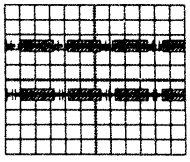
Sin
V:200mV/div
H:10μs/div

② TP11



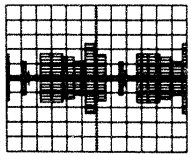
PRE OUT
V:500mV/div
H:10μs/div

③ Q502,Pin ⑤



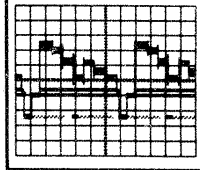
D4
V:1V/div
H:20μs/div

④ Q132,Emitter



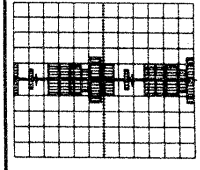
V:100mV/div
H:10μs/div

⑤ Q134,Pin ⑤



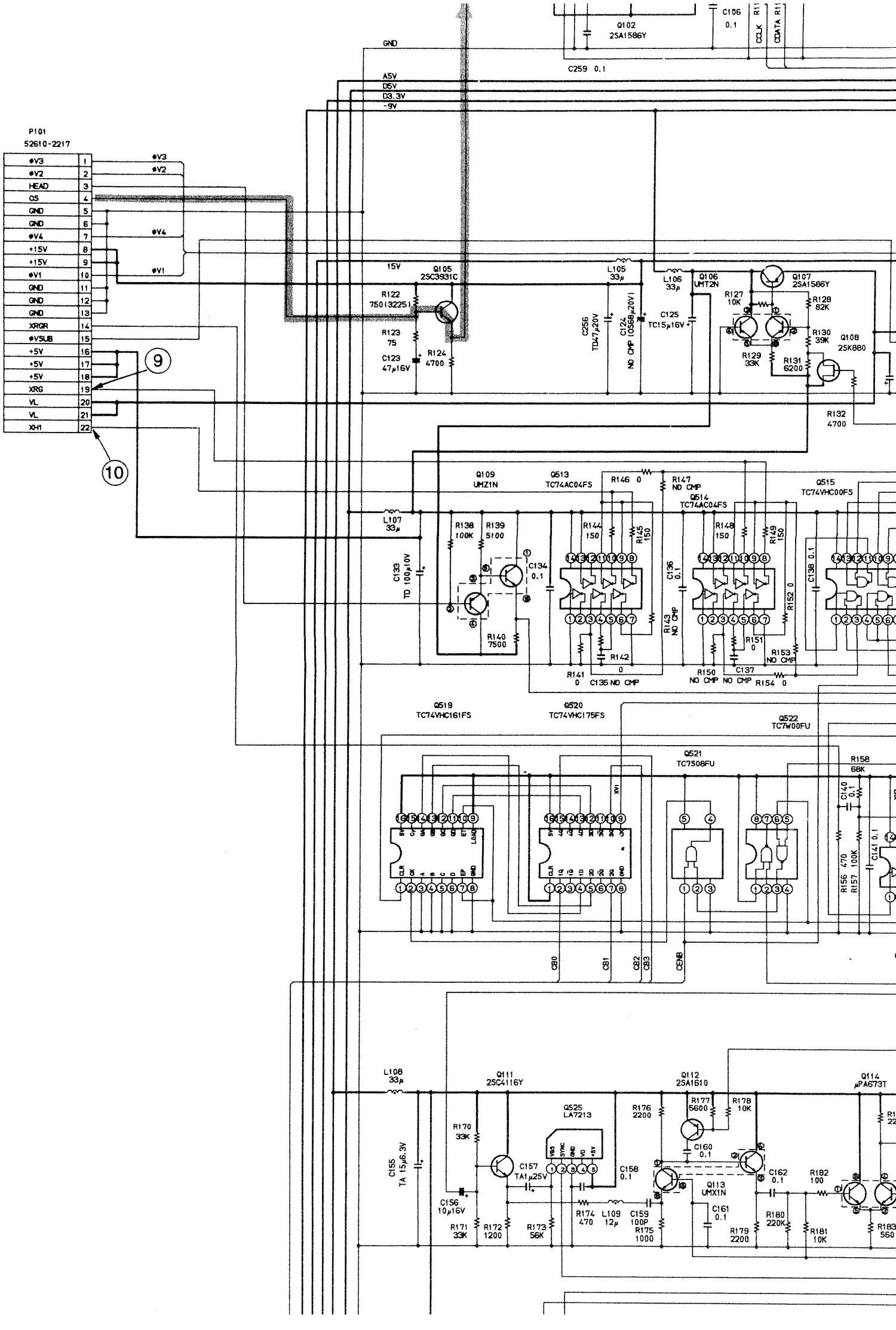
V:200mV/div
H:10μs/div

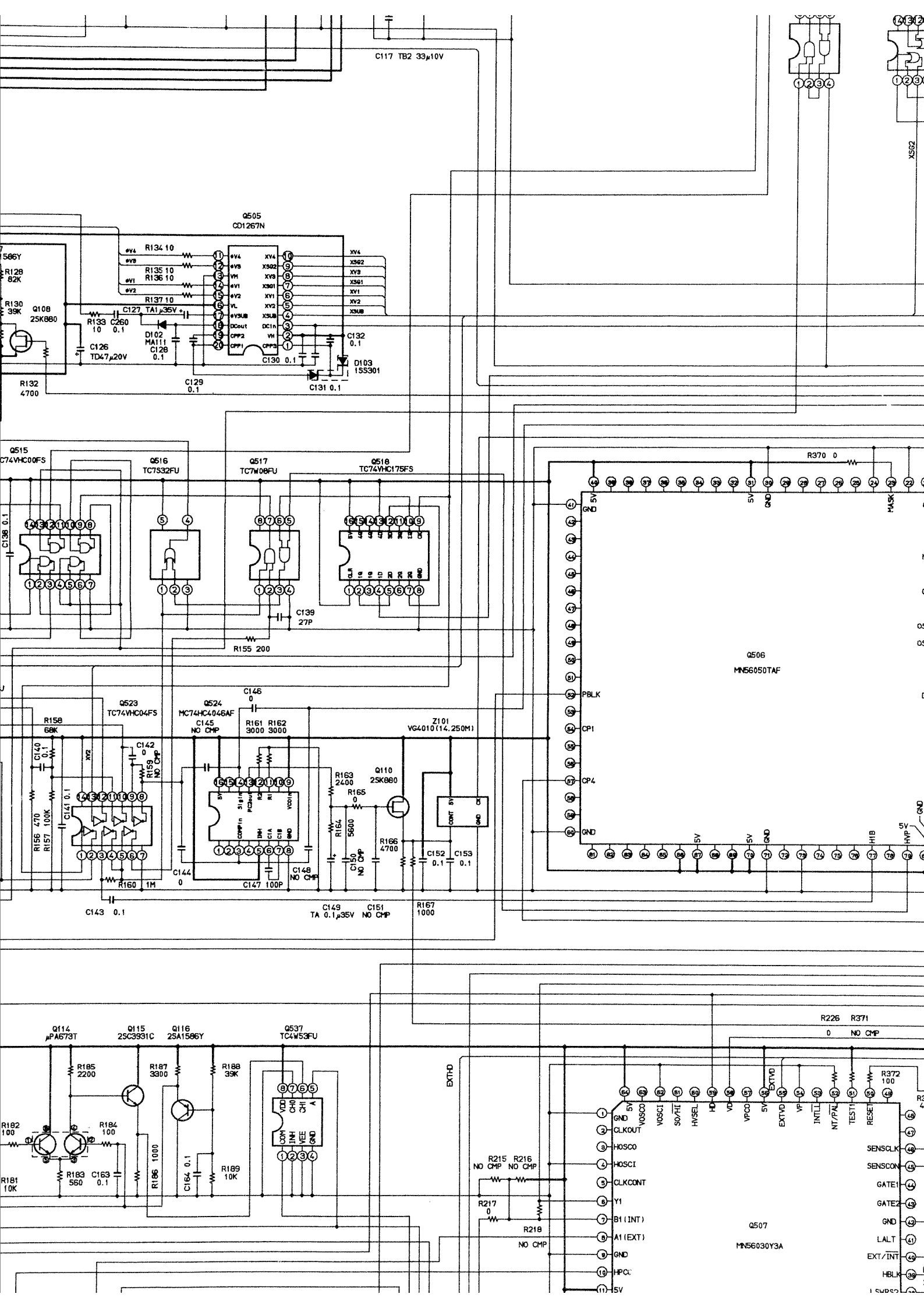
⑥ P103,Pin ⑭

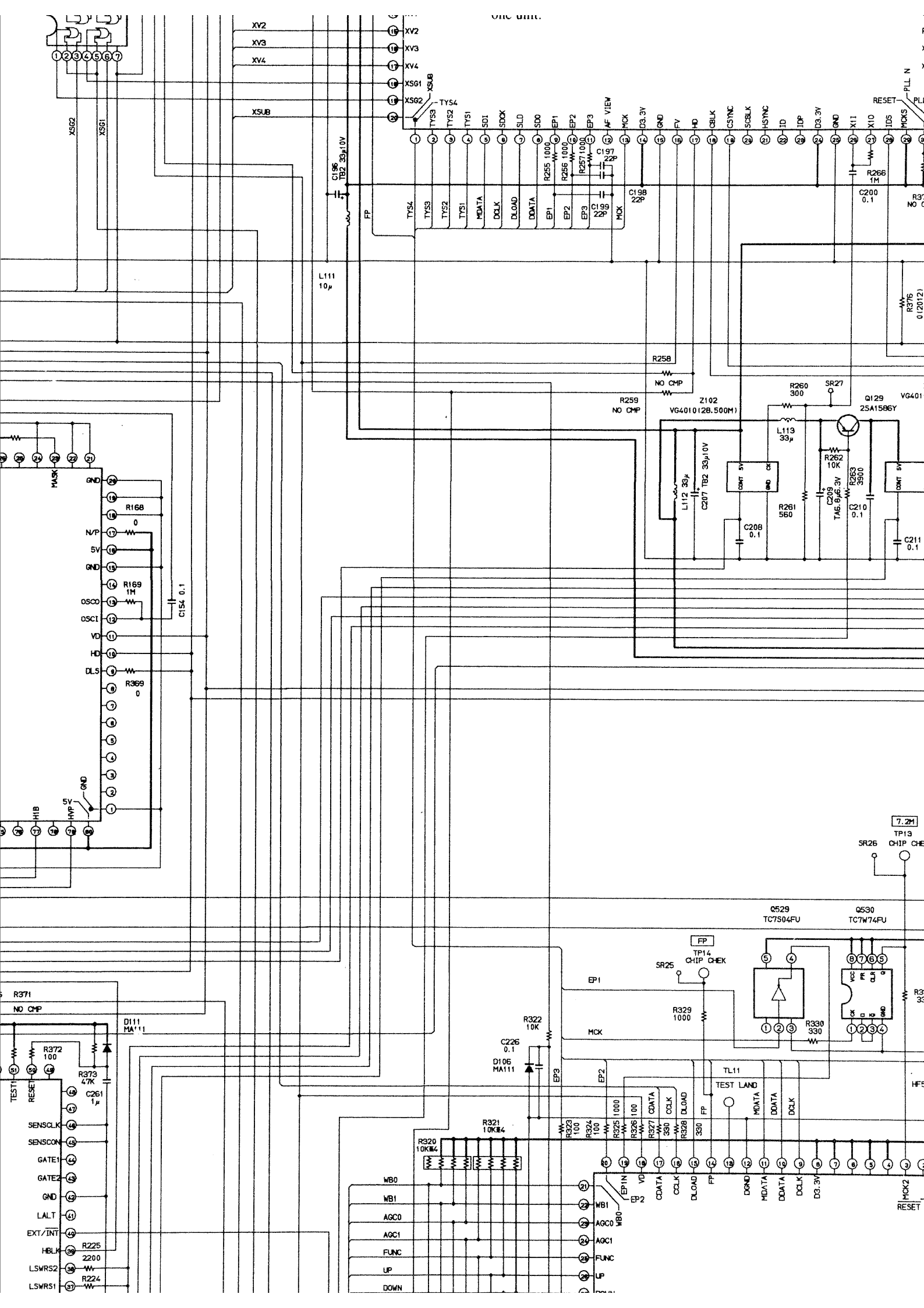


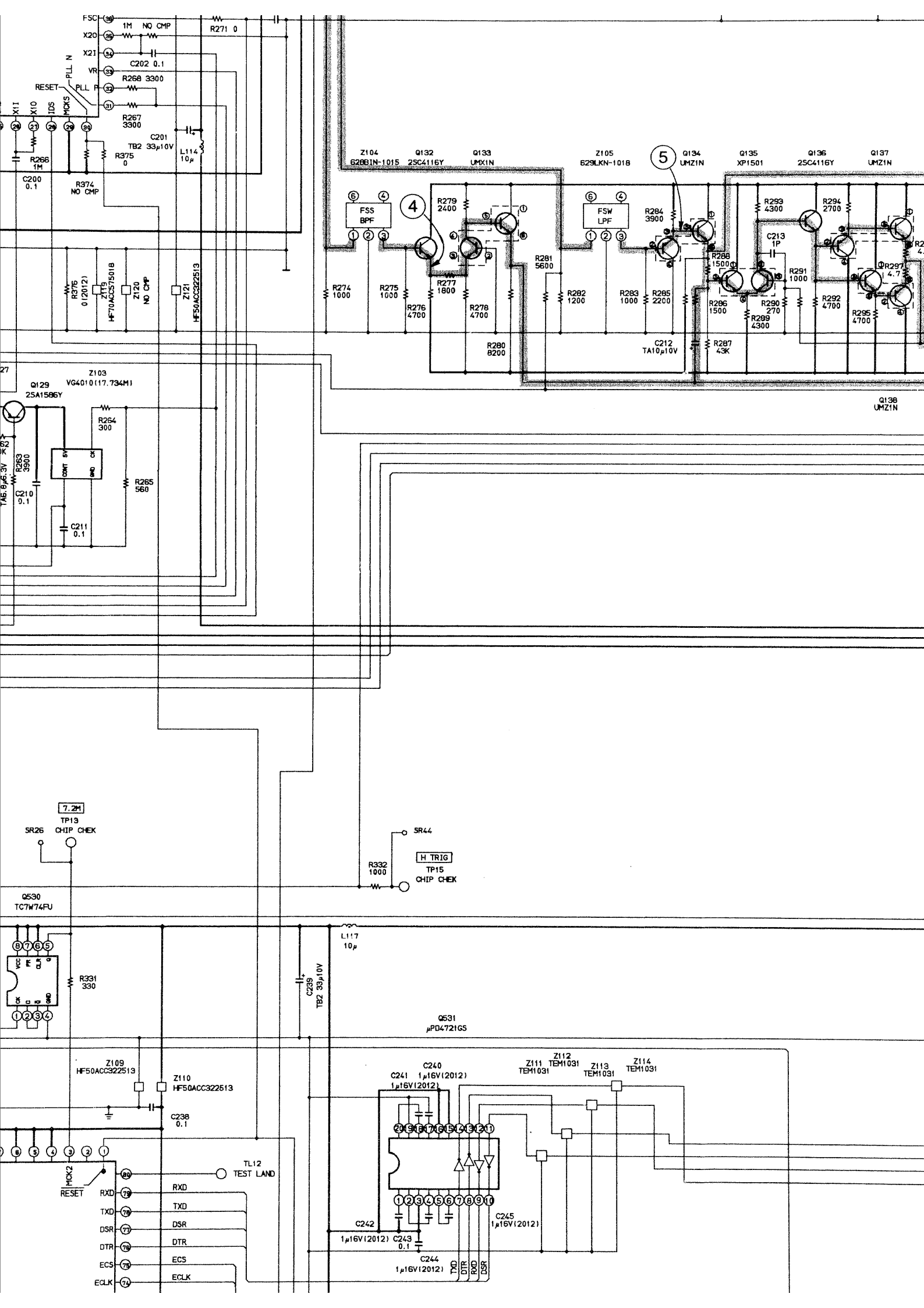
C
V:200mV/div
H:10μs/div

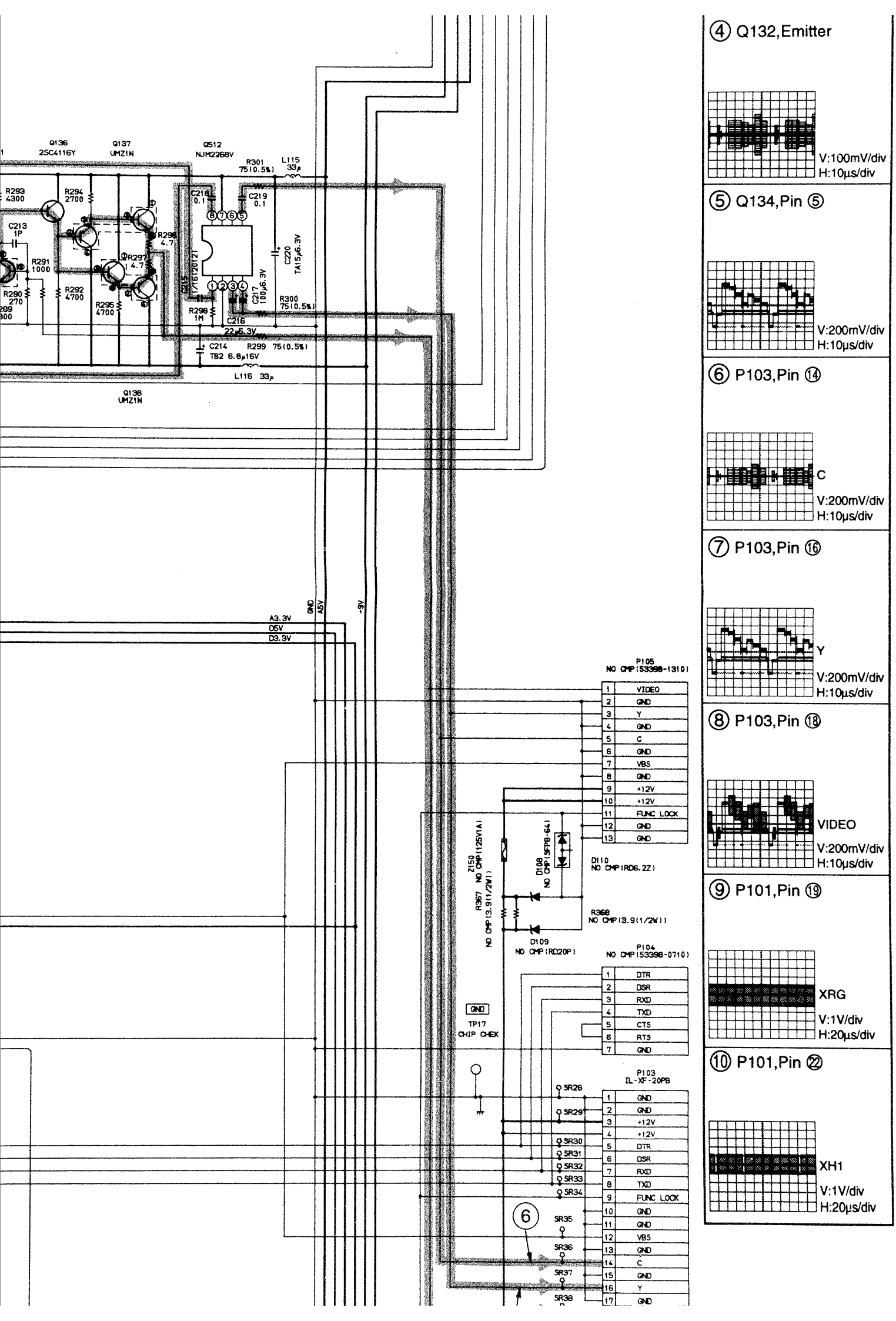
⑦ P103,Pin ⑯


P101
52610-2217
φV3 1
φV2 2
HEAD 3
OS 4
GND 5
GND 6
φV4 7
+15V 8
+15V 9
φV1 10
GND 11
GND 12
GND 13
XRGR 14
φVSUB 15
+5V 16
+5V 17
+5V 18
XRG 19
VL 20
VL 21
XH1 22
9
10
GND
A5V
D5V
D3.3V
-9V
Q102 2SA1586Y
C259 0.1
C106 0.1
CCLK
CDATA
15V
Q105 2SC3931C
R122 750(3225)
R123 75
C123 47μ16V
R124 4700
L105 33μ
L106 33μ
Q106 UMT2N
Q107 2SA1586Y
R127 10K
R128 82K
R129 33K
R130 39K
R131 6200
Q108 2SK880
C125 TC15μ16V
C256 TD47μ20V
C124 NO CMP (OS68μ20V)
R132 4700
Q109 UMZ1N
Q513 TC74AC04FS
Q514 TC74AC04FS
Q515 TC74VHC00FS
L107 33μ
C139 TD 100μ10V
R138 100K
R139 5100
C134 0.1
R140 7500
R144 150
R145 150
R146 0
R147 NO CMP
R148 150
R149 150
C136 0.1
R143 NO CMP
R152 0
R151 0
R153 NO CMP
R142 0
R141 0
C135 NO CMP
R150 NO CMP
NO CMP
C137
R154 0
C138 0.1
Q519 TC74VHC161FS
Q520 TC74VHC175FS
Q521 TC7S08FU
Q522 TC7W00FU
R158 68K
C140 0.1
C141 0.1
R156 470
R157 100K
CB0
CB1
CB2
CB3
CENB
L108 33μ
Q111 2SC4116Y
Q112 2SA1610
Q114 μPA673T
Q525 LA7213
R170 33K
R171 33K
R172 1200
R173 56K
C155 TA 15μ6.3V
C156 10μ16V
C157 TA1μ25V
R174 470
L109 12μ
C159 100P
R175 1000
C158 0.1
R176 2200
R177 5600
R178 10K
C160 0.1
Q113 UMX1N
C161 0.1
C162 0.1
R179 2200
R180 220K
R181 10K
R182 100
R183 560


C117 TB2 33μ10V
XS62
Q505
CD1267N
R134 10
R135 10
R136 10
R137 10
R133 10
C260 0.1
C127 TA1μ35V
D102 MA111
C128 0.1
C126 TD47μ20V
C129 0.1
C130 0.1
C131 0.1
C132 0.1
D103 1SS301
R132 4700
Q108 2SK880
R130 39K
R128 82K
Q515 C74VHC00FS
Q516 TC7S32FU
Q517 TC7W08FU
Q518 TC74VHC175FS
C138 0.1
C139 27P
R155 200
R370 0
Q506 MN56050TAF
Q523 TC74VHC04FS
Q524 MC74HC4046AF
C145 NO CMP
R161 3000
R162 3000
C146 0
Z101 VG4010(14.250M)
R158 68K
C140 0.1
C142 0
R159 NO CMP
C141 0.1
R156 470
R157 100K
R160 1M
C143 0.1
C144 0
C147 100P
C148 NO CMP
R163 2400
R164 5600
R165 0
Q110 2SK880
C150 NO CMP
R166 4700
C152 0.1
C153 0.1
C149 TA 0.1μ35V
C151 NO CMP
R167 1000
Q114 μPA673T
Q115 2SC3931C
Q116 2SA1586Y
Q537 TC4W53FU
R185 2200
R187 3300
R188 39K
R182 100
R184 100
R183 560
C163 0.1
R186 1000
C164 0.1
R189 10K
R181 10K
EXTHD
R226 0
R371 NO CMP
R372 100
R215 NO CMP
R216 NO CMP
R217 0
R218 NO CMP
Q507 MN56030Y3A
GND
CLKOUT
HOSCO
HOSCI
CLKCONT
Y1
B1(INT)
A1(EXT)
HPCO
5V
VOSCO
VOSCI
SO/HI
HVSEL
HD
VD
VPCO
EXTVD
VP
INTLL
NT/PAL
TEST1
RESET
SENSCLK
SENSCON
GATE1
GATE2
LALT
EXT/INT
HBLK
MASK
PBLK
CP1
CP4
H1B
HVP


XV2
XV3
XV4
XSG1
XSG2
XSUB
TYS4
TYS3
TYS2
TYS1
SDI
SDCK
SLD
SDO
EP1
EP2
EP3
AF VIEW
MCK
D3.3V
GND
FV
HD
CBLK
CSYNC
SCBLK
HSYNC
ID
IDP
D3.3V
GND
X11
X10
IDS
MCKS
RESET
PLL N
C196 TB2 33µ10V
C197 22P
C198 22P
C199 22P
R255 1000
R256 1000
R257 1000
R266 1M
C200 0.1
L111 10µ
FP
MDATA
DCLK
DLOAD
DDATA
R258 NO CMP
R259 NO CMP
Z102 VG4010128.500M1
R260 300
SR27
Q129 2SA1586Y
L113 33µ
R262 10K
R263 3900
C209 TA6.8µ6.3V
C210 0.1
C211 0.1
L112 33µ
C207 TB2 33µ10V
C208 0.1
R261 560
CONT
5V
CK
GND
MASK
R168 0
N/P
R169 1M
OSCO
OSCI
VD
HD
DLS
R369 0
C154 0.1
HVP
H1B
7.2M
TP13
CHIP CHE
SR26
Q529 TC7S04FU
Q530 TC7W74FU
TP14
CHIP CHEK
SR25
R329 1000
R330 330
R322 10K
C226 0.1
D106 MA111
TL11
TEST LAND
R321 10K×4
R320 10K×4
R323 100
R324 100
R325 1000
R326 100
R327 330
R328 330
CDATA
CCLK
DGND
R371 NO CMP
D111 MA111
R372 100
R373 47K
C261 1µ
TEST1
RESET
SENSCLK
SENSCON
GATE1
GATE2
LALT
EXT/INT
HBLK
LSWRS2
LSWRS1
R225 2200
R224
WB0
WB1
AGC0
AGC1
FUNC
UP
DOWN
MCK2


FSC
X20
X21
VR
RESET
PLL N
PLL P
1M NO CMP
R271 0
C202 0.1
R268 3300
R267 3300
C201 TB2 33μ10V
L114 10μ
R375 0
R266 1M
C200 0.1
R374 NO CMP
X11
X10
IDS
MCK5
Z104 628BIN-1015
Q132 2SC4116Y
Q133 UMX1N
Z105 629LKN-1018
Q134 UMZ1N
Q135 XP1501
Q136 2SC4116Y
Q137 UMZ1N
FSS BPF
FSW LPF
R279 2400
R277 1800
R274 1000
R275 1000
R276 4700
R278 4700
R280 8200
R281 5600
R282 1200
R283 1000
R284 3900
R285 2200
R286 1500
R287 43K
C212 TA10μ10V
C213 1P
R288 1500
R289 4300
R290 270
R291 1000
R292 4700
R293 4300
R294 2700
R295 4700
R297 4.7
Q138 UMZ1N
R376 0(2012)
Z119 HF70ACC575018
Z120 NO CMP
Z121 HF50ACC322513
Z103 VG4010(17.734M)
Q129 2SA1586Y
R264 300
R263 3900
R265 560
C210 0.1
C211 0.1
7.2M
TP13 CHIP CHEK
SR26
SR44
H TRIG
TP15 CHIP CHEK
R332 1000
Q530 TC7W74FU
R331 330
L117 10μ
C239 TB2 33μ10V
Q531 μPD4721GS
Z109 HF50ACC322513
Z110 HF50ACC322513
C238 0.1
Z111 TEM1031
Z112 TEM1031
Z113 TEM1031
Z114 TEM1031
C240
C241 1μ16V(2012)
C242 1μ16V(2012)
C243 0.1
C244 1μ16V(2012)
C245 1μ16V(2012)
TL12 TEST LAND
MCK2
RESET
RXD
TXD
DSR
DTR
ECS
ECLK



④ Q132,Emitter

V:100mV/div
H:10μs/div

⑤ Q134,Pin ⑤

V:200mV/div
H:10μs/div

⑥ P103,Pin ⑭

C
V:200mV/div
H:10μs/div

⑦ P103,Pin ⑯

Y
V:200mV/div
H:10μs/div

⑧ P103,Pin ⑱

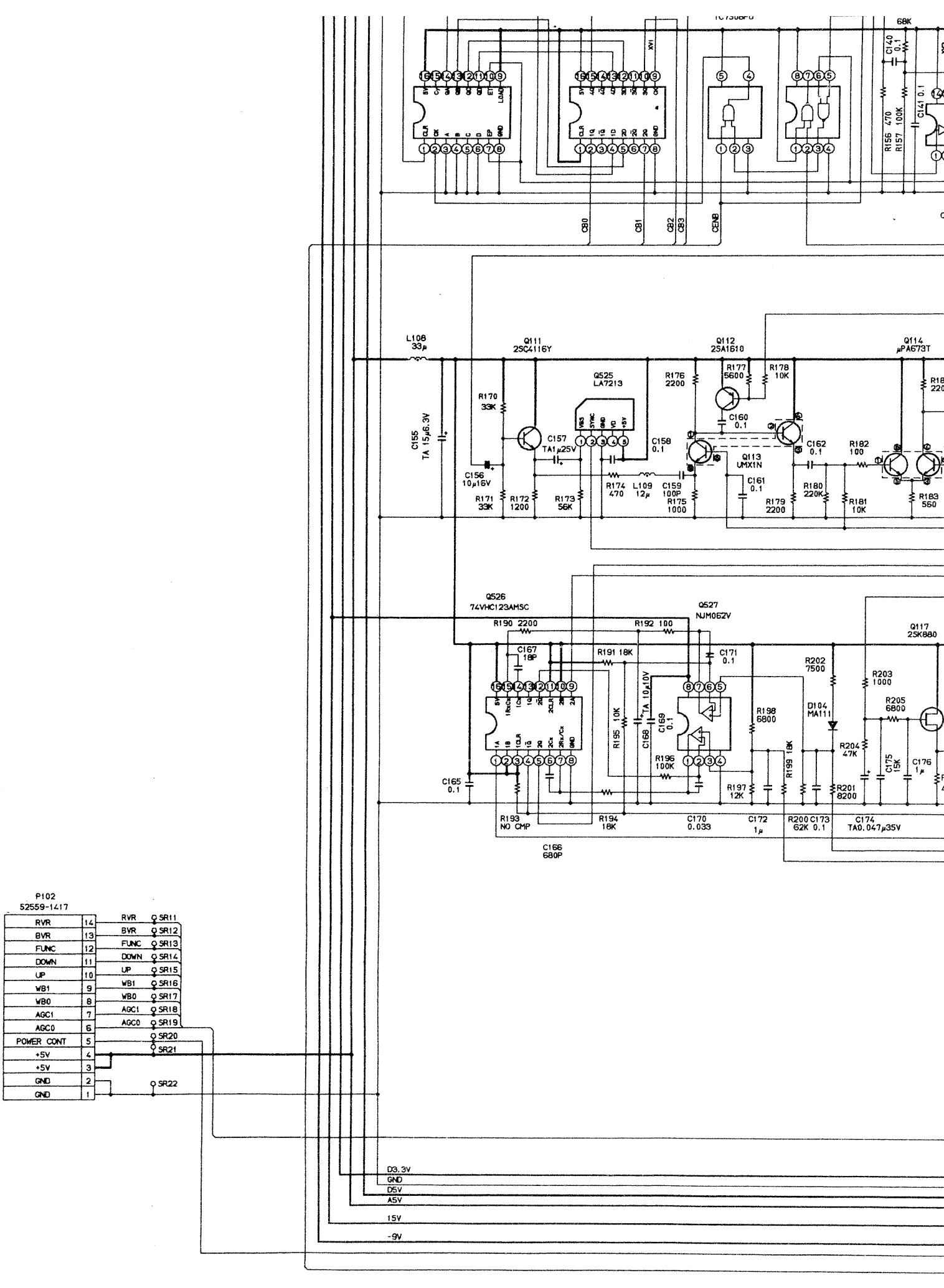
VIDEO
V:200mV/div
H:10μs/div

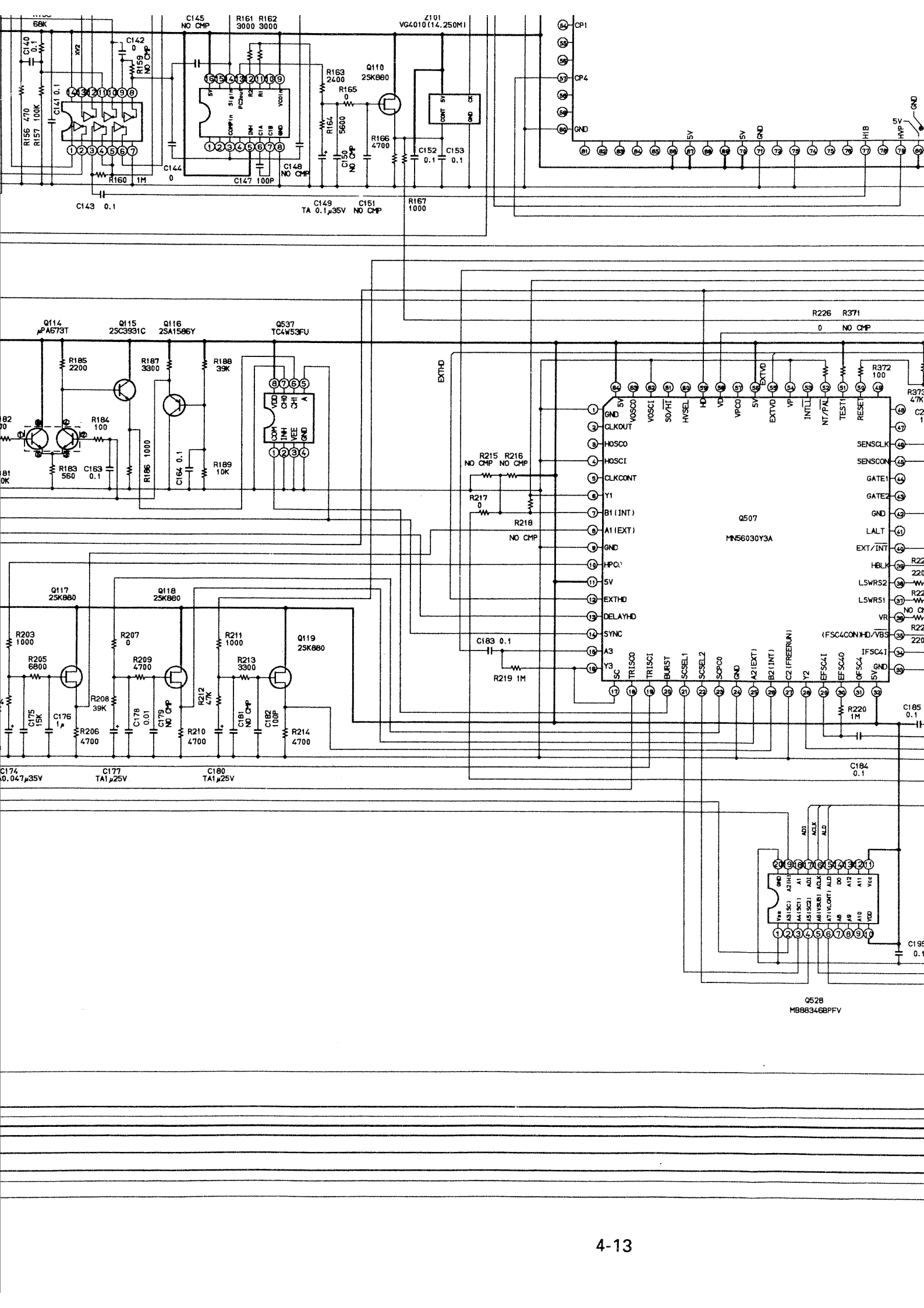
⑨ P101,Pin ⑲

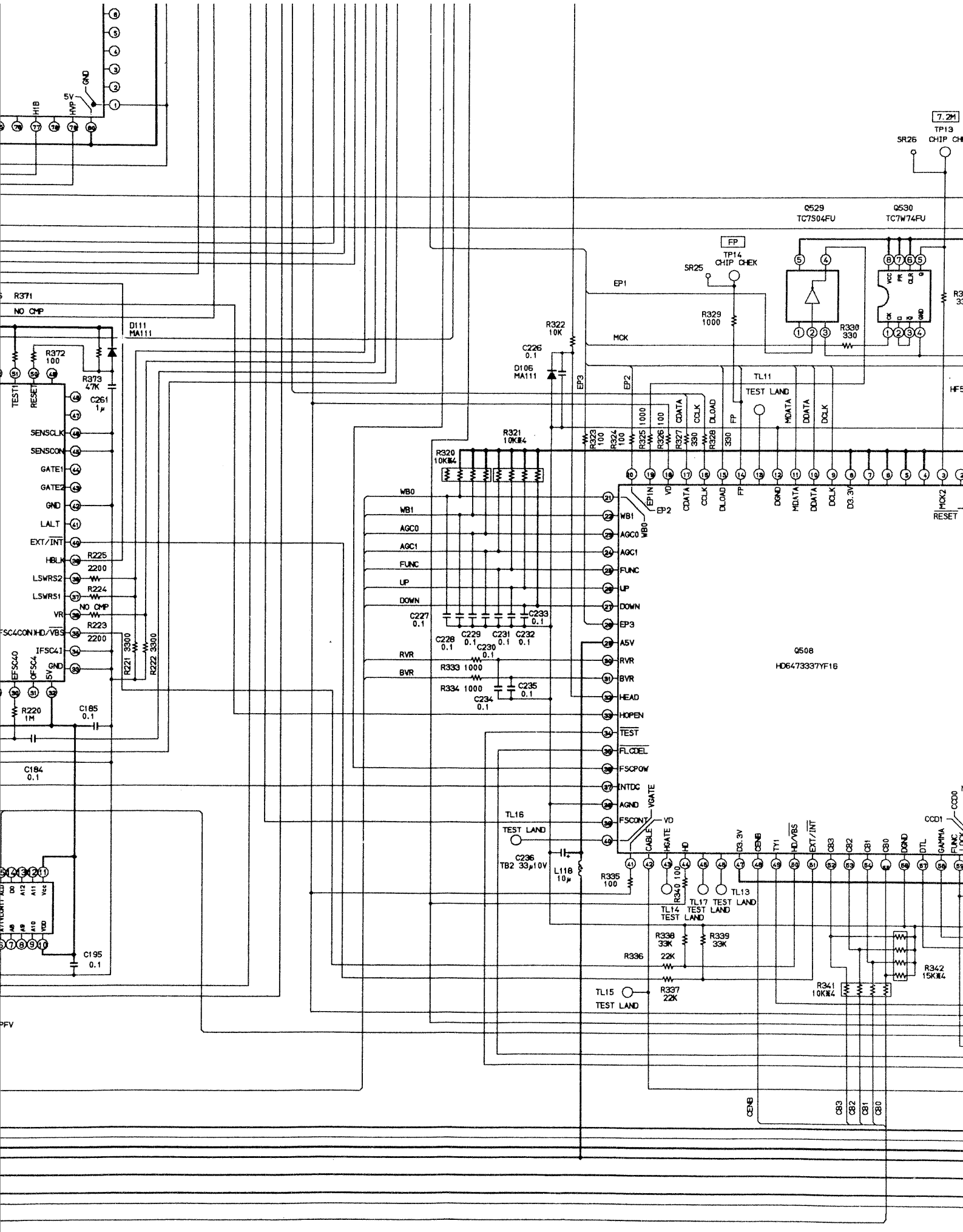
XRG
V:1V/div
H:20μs/div

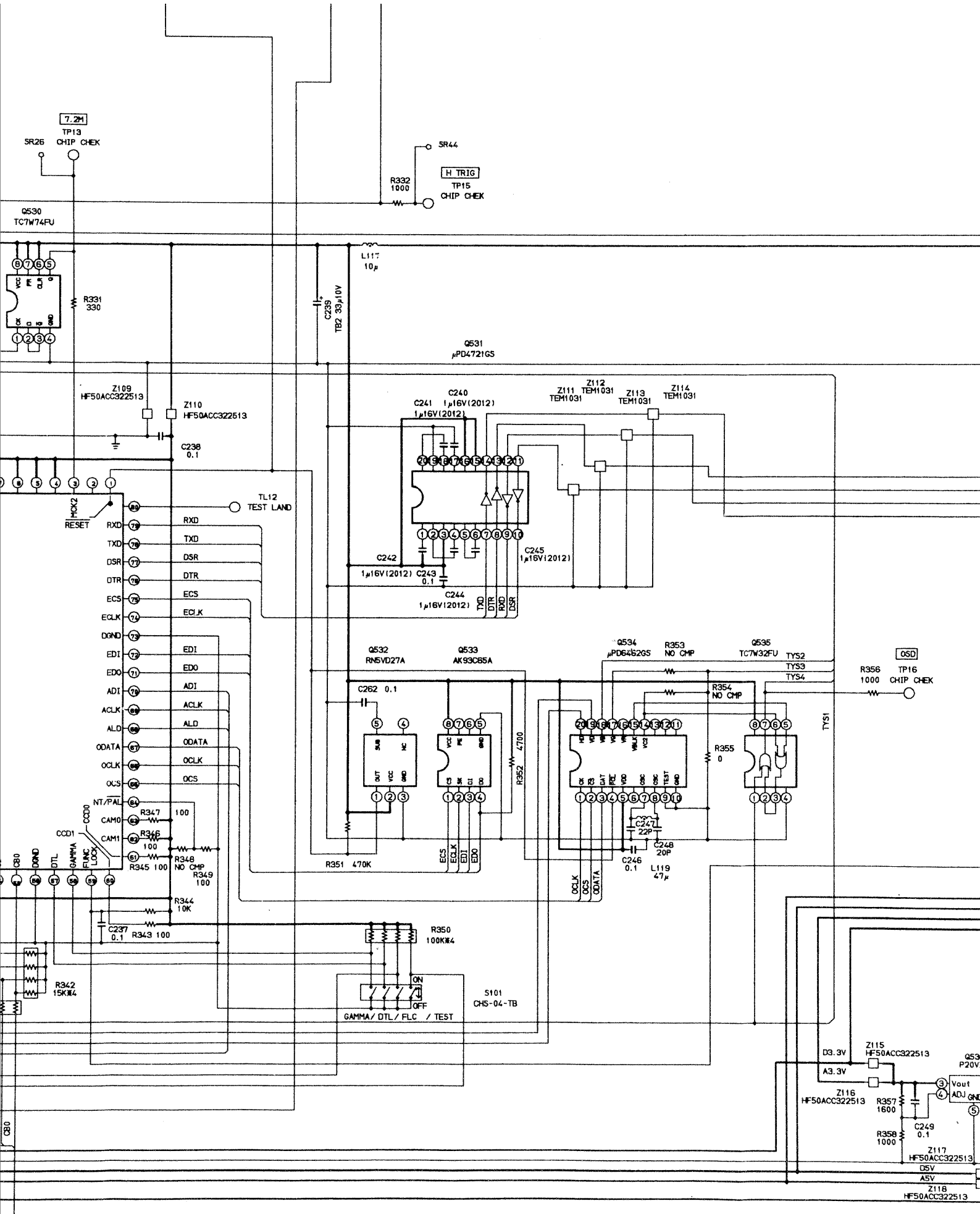
⑩ P101,Pin ㉒

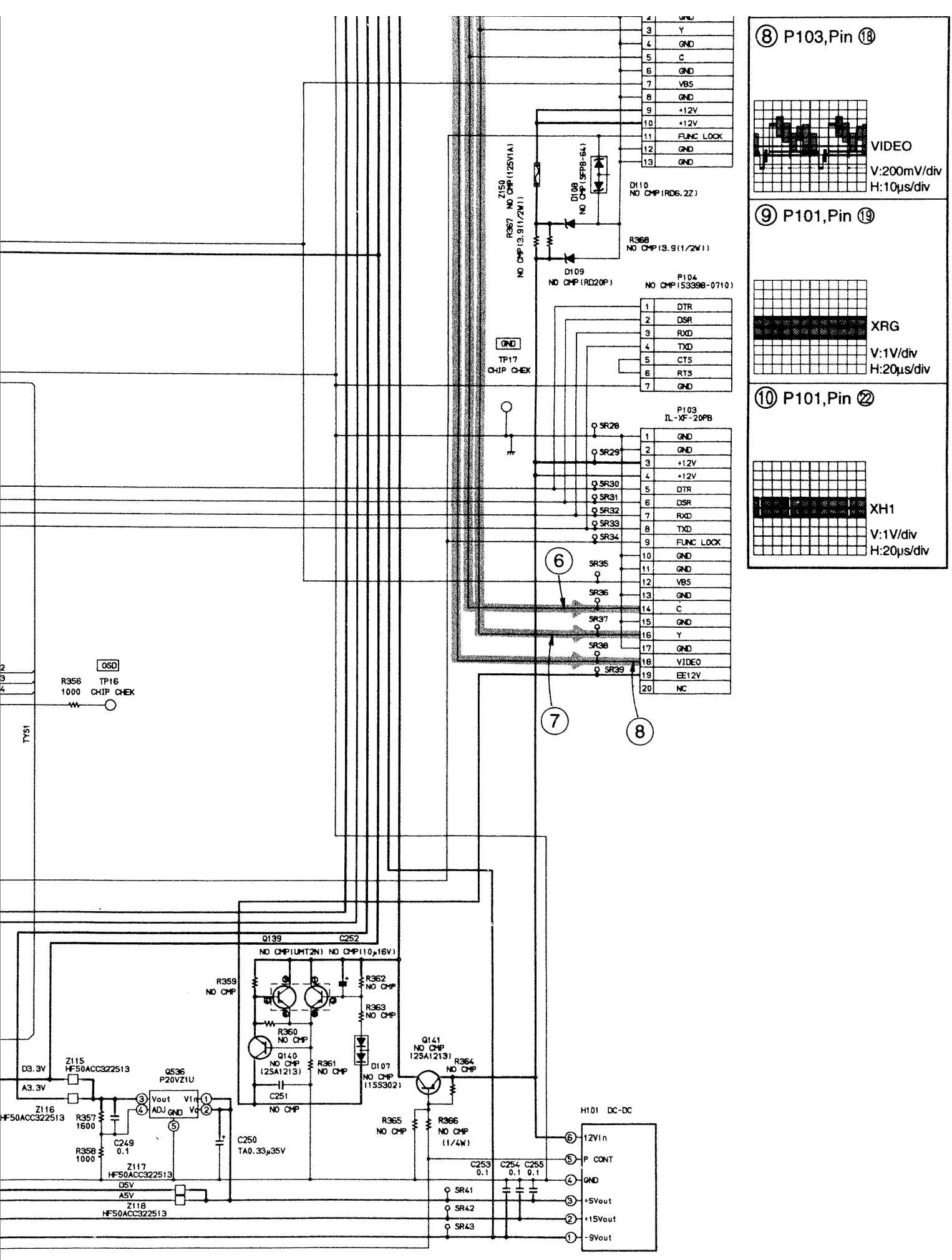
XH1
V:1V/div
H:20μs/div


P102
52559-1417
RVR 14
BVR 13
FUNC 12
DOWN 11
UP 10
WB1 9
WB0 8
AGC1 7
AGC0 6
POWER CONT 5
+5V 4
+5V 3
GND 2
GND 1
SR11
SR12
SR13
SR14
SR15
SR16
SR17
SR18
SR19
SR20
SR21
SR22
Q111 2SC4116Y
Q112 2SA1610
Q113 UMX1N
Q114 μPA673T
Q525 LA7213
Q526 74VHC123AMSC
Q527 NJM062V
Q117 2SK880
D104 MA111
L106 33μ
L109 12μ
C80
C81
C82
C83
CENB
D3.3V
GND
D5V
A5V
15V
-9V


Q507
MN56030Y3A
Q528
MB88346BPFV
Q114 μPA673T
Q115 2SC3931C
Q116 2SA1586Y
Q537 TC4W53FU
Q117 2SK880
Q118 2SK880
Q119 2SK880
Q110 2SK880
Z101 VG4010(14.250MI)
EXTHD
R226 R371
0 NO CMP
R215 R216
NO CMP NO CMP
R217 0
R218
NO CMP
R219 1M
C183 0.1
C184 0.1
R220 1M
C185 0.1
C195 0.1
C174 0.047μ35V
C177 TA1μ25V
C180 TA1μ25V
C149 TA 0.1μ35V NO CMP
C143 0.1
C144 0
C145 NO CMP
C147 100P
C148 NO CMP
C150 NO CMP
C151
C152 0.1
C153 0.1
C163 0.1
C164 0.1
R160 1M
R161 R162 3000 3000
R163 2400
R164 5600
R165 0
R166 4700
R167 1000
R183 560
R184 100
R185 2200
R186 1000
R187 3300
R188 39K
R189 10K
R203 1000
R205 6800
R206 4700
R207 0
R208 39K
R209 4700
R210 4700
R211 1000
R212 47K
R213 3300
R214 4700
C175 15K
C176 1μ
C178 0.01
C179 NO CMP
C181 NO CMP
C182 100P
R372 100
R373 47K
R22 220
R22 220
R22 220
NO CMP
C141 0.1
C142 0
R156 470
R157 100K
R159 NO CMP
XV2
CP1
CP4
GND
5V
HIB
HVP
VOSCO
VOSCI
SO/HI
HVSEL
HD
VD
VPCO
EXTVD
VP
INTL
NT/PAL
TEST
RESET
CLKOUT
HOSCO
HOSCI
CLKCONT
Y1
B1(INT)
A1(EXT)
HPCO
DELAYHD
SYNC
A3
Y3
SENSCLK
SENSCON
GATE1
GATE2
LALT
EXT/INT
HBLK
LSWRS2
LSWRS1
VR
(FSC4CON)HD/VBS
IFSC41
TRI5CO
TRI5CI
BURST
SCSEL1
SCSEL2
SCPC0
A2(EXT)
B2(INT)
C2(FREERUN)
EFSC41
EFSC40
CFSC4


Q529
TC7S04FU
Q530
TC7W74FU
Q508
HD6473337YF16
TP13
CHIP CHE
SR26
TP14
CHIP CHEK
SR25
FP
EP1
MCK
R322
10K
R329
1000
R330
330
C226
0.1
D106
MA111
D111
MA111
R371
NO CMP
R372
100
R379
47K
C261
1μ
TEST1
RESET
SENSCLK
SENSCON
GATE1
GATE2
GND
LALT
EXT/INT
HBLK
LSWRS2
LSWRS1
VR
FSC4CON
HD/VBS
IFSC41
IFSC40
QFSC4
5V
R225
2200
R224
NO CMP
R223
2200
R221
3300
R222
3300
R220
1M
C185
0.1
C184
0.1
C195
0.1
TL11
TEST LAND
R321
10K×4
R320
10K×4
R323
100
R324
100
R325
1000
R326
100
R327
330
R328
330
CDATA
CCLK
DLOAD
MDATA
DDATA
DCLK
D3.3V
DGND
WB0
WB1
AGC0
AGC1
FUNC
UP
DOWN
EP3
A5V
RVR
BVR
HEAD
HOPEN
TEST
FLCDEL
FSCPOW
INTDC
AGND
FSCONT
VGATE
CABLE
HGATE
HD
VD
C227
0.1
C228
0.1
C229
0.1
C230
0.1
C231
0.1
C232
0.1
C233
0.1
C234
0.1
C235
0.1
R333
1000
R334
1000
TL16
TEST LAND
C236
TB2 33μ10V
L118
10μ
R335
100
R340
100
TL13
TL14
TEST LAND
TL17
TEST LAND
R338
33K
R339
33K
R336
22K
R337
22K
TL15
TEST LAND
R341
10K×4
R342
15K×4
CENB
TY1
CB3
CB2
CB1
CB0
DGND
DTL
GAMMA
FUNC
CCD0
CCD1
RESET
MCK2


7.2M
TP13
CHIP CHEK
SR26
SR44
H TRIG
TP15
CHIP CHEK
R332
1000
Q530
TC7W74FU
L117
10μ
C239
TB2 33μ10V
R331
330
Q531
μPD4721GS
Z109
HF50ACC322513
Z110
HF50ACC322513
C238
0.1
C240
C241 1μ16V(2012)
1μ16V(2012)
Z111 TEM1031
Z112 TEM1031
Z113 TEM1031
Z114 TEM1031
C242
1μ16V(2012)
C243
0.1
C244
1μ16V(2012)
C245
1μ16V(2012)
TXD
DTR
RXD
DSR
TL12
TEST LAND
MCK2
RESET
RXD
TXD
DSR
DTR
ECS
ECLK
DGND
EDI
EDO
ADI
ACLK
ALD
ODATA
OCLK
OCS
NT/PAL
CAM0
CAM1
CCD0
CCD1
R347 100
R346 100
R348 NO CMP
R349 100
R345 100
R344 10K
C237 0.1
R343 100
Q532
RN5VD27A
Q533
AK93C65A
Q534
μPD6452GS
R353
NO CMP
Q535
TC7W32FU
TYS2
TYS3
TYS4
TYS1
OSD
R356
1000
TP16
CHIP CHEK
C262 0.1
R352 4700
R354
NO CMP
R355
0
C247
22P
C248
20P
C246
0.1
L119
47μ
R351 470K
ECS
ECLK
EDI
EDO
OCLK
OCS
ODATA
R350
100K×4
R342
15K×4
S101
CHS-04-TB
ON
OFF
GAMMA/ DTL/ FLC / TEST
D3.3V
A3.3V
Z115
HF50ACC322513
Z116
HF50ACC322513
R357
1600
R358
1000
C249
0.1
Vout
ADJ
GND
Z117
HF50ACC322513
D5V
A5V
Z118
HF50ACC322513


P104
NO CMP(53398-0710)
1 DTR
2 DSR
3 RXD
4 TXD
5 CTS
6 RTS
7 GND
P103
IL-XF-20PB
1 GND
2 GND
3 +12V
4 +12V
5 DTR
6 DSR
7 RXD
8 TXD
9 FUNC LOCK
10 GND
11 GND
12 VBS
13 GND
14 C
15 GND
16 Y
17 GND
18 VIDEO
19 EE12V
20 NC
3 Y
4 GND
5 C
6 GND
7 VBS
8 GND
9 +12V
10 +12V
11 FUNC LOCK
12 GND
13 GND
Z150 NO CMP(125V1A)
R367 NO CMP(3.91(2W))
D108 NO CMP(SFPB-64)
D110 NO CMP(RD6.2Z)
R368 NO CMP(3.9(1/2W))
D109 NO CMP(RD20P)
GND
TP17 CHIP CHEK
SR28
SR29
SR30
SR31
SR32
SR33
SR34
SR35
SR36
SR37
SR38
SR39
6
7
8
OSD
R356 1000
TP16 CHIP CHEK
TYS1
Q139 NO CMP(UMT2N)
C252 NO CMP(10μ16V)
R359 NO CMP
R362 NO CMP
R363 NO CMP
R360 NO CMP
Q140 NO CMP (2SA1213)
R361 NO CMP
D107 NO CMP (1SS302)
C251 NO CMP
Q141 NO CMP (2SA1213)
R364 NO CMP
R365 NO CMP
R366 NO CMP (1/4W)
D3.3V
A3.3V
Z115 HF50ACC322513
Z116 HF50ACC322513
Q536 P20VZ1U
Vout ADJ VIn GND Vc
R357 1600
R358 1000
C249 0.1
C250 TA0.33μ35V
Z117 HF50ACC322513
D5V
A5V
Z118 HF50ACC322513
H101 DC-DC
12Vin
P CONT
GND
+5Vout
+15Vout
-9Vout
C253 0.1
C254 0.1
C255 0.1
SR41
SR42
SR43
⑧ P103,Pin ⑱
VIDEO
V:200mV/div
H:10μs/div
⑨ P101,Pin ⑲
XRG
V:1V/div
H:20μs/div
⑩ P101,Pin ㉒
XH1
V:1V/div
H:20μs/div

SECTION 5
SPECIFICATIONS

1. SPECIFICATIONS

Power supply		DC12V ± 0.5V
Power consumption		360 mA
Image sensor		1/2 inch IT-CCD
Effective pixels		Horizontal: 752 pixels, Vertical: 582 pixels
Effective image area		Horizontal: 6.47 mm, Vertical: 4.83 mm (1/2 inch type)
Scanning system		2:1 interlace
Scan frequency		Horizontal: 15.625 kHz, Vertical: 50 Hz
Sync system		Internal/External (automatic switching)
Resolution		Horizontal: More than 470 lines, Vertical: More than 420 lines
Standard intensity of illumination for objects		60 lx (F1.6, 3000K)
Minimum intensity of illumination for objects		5 lx (F1.6, 3000K)
S/N ratio		46 dB or more
Video output		VBS 1.0 V(p-p), (BNC terminal) PAL system Y/C separation output (S terminal)
Output impedance		75Ω unbalanced
External sync	Input	VBS 1.0 V(p-p) (BNC terminal) PAL 75Ω unbalanced
	Adjustment function	Subcarrier phase, H phase
White balance		Automatic/set/manual
Gain switch (AGC)		SENS UP (+6 dB)/ON/OFF
Electronic shutter		Automatic, 1/50s, 1/120s, 1/250s, 1/500s, 1/1000s, 1/2000s, 1/4000s, 1/10000s, synchronized scan
Operating temperature/ humidity		14°F to 104°F (–10°C to +40°C)/Less than 90%
Anti-vibration/ shock characteristics		70 m/s² (10 to 200 Hz)/700 m/s²
Weight		Control unit: 0.86 lbs (390g)
Dimensions (Without protrusion)		Control unit: W: 3.35", H: 1.57", D: 6.14" (W: 85 mm, H: 40 mm, D: 156 mm)

Design and specifications are subject to change without notice.